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Balanced Scorecard in ArchiMate

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“However beautiful the strategy, you should occasionally look at the results”

Sir Winston Churchill (Coyier, n.d.)

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Abstract

With the growing globalization process and the current economic situation, the organizations are being forced to become more customer-oriented following the market needs. It is necessary to continuously readapt the strategy and monitor it to quickly answer to business opportunities with small improvements towards significant competitive advantages.

Kaplan and Norton (2001) conclude that competitive advantage comes more from intangible knowledge, capabilities, and relationships created by employees. To measure those intangible parameters, they present in the early 90s, the Balanced Scorecard (BSC). A framework to measure and provide feedback to organizations with the objective of driving performance.

Many organizations have ambitious plans for growth, but only a few ever realize them. To answer to the persistent gap between ambition and performance, Kaplan and Norton (2008) presented a Management Cycle (MC) a six-stage framework that link strategy to operations to help more than formulating, plan, implement, monitor, control, test and adapt the strategy, to create or improve a competitive advantage.

This dissertation focuses on the creation of the metamodel of BSC in ArchiMate; in the relationship between strategy concepts and ArchiMate elements as well as understand if this modelling language can help to apply BSC to an organization. To accomplish that it was necessary to realize the link between the MC and the BSC, and comprehend the tools involved. Then the metamodel created was applied to a healthcare organization, namely Luz Saúde, to demonstrate how this modeling tool can simplify the BSC implementation.

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List of Abbreviations

BSA – Business Strategy Analysis

BSC – Balanced Scorecard

CA – Change Agenda

CP – Customer Perspective

DSRM – Design Science Research Method

EA – Enterprise Architecture

FP – Financial Perspective

GES – Grupo Espírito Santo

I – Initiative

IPP – Internal Process Perspective

KPI - Key Performance Indicator

LGP – Learn & Growth Perspective

LS – Luz Saúde

M – Measure

MC – Management Cycle

MVV – Mission, Vision and Values

OMG - Object Management Group

PS – Purpose Statement

SM – Strategy Map

SNS – Serviço Nacional de Saúde (National Health Service)

SO – Strategic Objective

T – Target

1 Introduction

This dissertation focuses on the representation of the Balanced Scorecard (BSC) in ArchiMate and on how this framework can help in the BSC application.

This chapter begins by presenting the context and motivation of this work (section 1) and in the second section the description of the problem as well as the objectives. Section 3 presents the research question that must be answered. Section 4 shows the methodology for approaching the problem, and in the last section is introduced the general framework of the work developed.

1.1 Motivation

Due to the growing globalization process and the current economic situation, the power has shifted from the producer to the customer, forcing organizations to become more aware of the market needs. Corporations are adding value to their core corporate offerings through services. The trend is pervading almost all industries, is customer demand-driven, and perceived by companies as sharpening their competitive edges. To capitalize business opportunities, organizations need to improve their business processes and operations to become more flexible, manage shorter service and products life cycles, and thus satisfy their customers by continuously adapting themselves to meet the needs and expectations of the market.

Furthermore, to become more customer-oriented, companies have been enhancing their management capabilities by shifting from a standalone functional oriented approach to an inter-firm process centered strategy, where the strategy must be adapted and continuously monitored to quickly answer to business opportunities with special and innovative requirements, considering that surgical improvements can present significant competitive advantages. To gain such competitive advantages, decision makers are more and more interested in developing strategies designed to provide companies with resources and capabilities that will allow them to implement quantitative systems methodologies so that they can control their processes more proactively.

Therefore, process-based companies are enhancing their decision-making capabilities by evaluating risks, uncertainties, and variability within this important task. Even though process management is a valuable tool for operations analysis, its potential in the strategic scope is also large and perhaps still untapped. Thus, to efficiently achieve the goals enumerated before, organizations must be able to implement and maintain the ability to continuously monitor and foresee the behavior of their business by tracking the performance of all value chain.

Using a proper combination of measures, as well as a tool capable of collecting, analyze and show real-time structured performance information, it is possible to monitor and control business in a proactive way. Many organizations have ambitious plans for growth, but only a few ever realize them. Kaplan & Norton (2005) identify a gap between strategy formulation and strategy execution which is translated in a persistent gap between ambition and performance.

The competitiveness of an organization doesn't depend only on financial factors. Instead, a hierarchy of several indicators should be defined, monitored and improved to lead the company to the strategic goals defined by top management.

Most of the companies know how to verbalize the strategy, but most of them do not know how to fill the problem of implementing and evaluating it. For that, Kaplan and Norton create a five steps framework to link strategy and operations in 2008. Then later they add one more step to

improve their management system, which describes how to help the organizations, more than formulating, to plan, implement, monitor, control, test and adapt the strategy, in order to create or improve the competitive advantage. (Kaplan & Norton, 2008) (ClearPoint Strategy, 2016)

1.2 Problem Identification

This study was developed within the scope of the Master's degree in Engineering of Services and Management (MESG) of the Faculty of Engineering of the University of Porto.

In this chapter is presented the problem to the thesis proposal, that is modeling the metamodel of the Balanced Scorecard (BSC) in ArchiMate and understand if this modeling language can help to apply the BSC to an organization.

BSC is a framework that helps to achieve the process to implement the strategy and is a tool used in Stage 2 of the Management Cycle (MC). The author was not able to dissociate one from the other because to implement the BSC it is needed to have the strategy developed (Stage 1 of MC) and the Strategic Objectives (SO's) achieved (Strategy Map (SM) in Stage 2). For improving the strategy and the way how the organization runs it, is necessary: *Align the Organization* (Stage 3); *Plan Operations* (Stage 4); *Monitor and Learn* (Stage 5); and *Test and Adapt* the strategy (Stage 6); as we can see in chapter 2. Although every stages are interconnected, this document focused on the first and second.

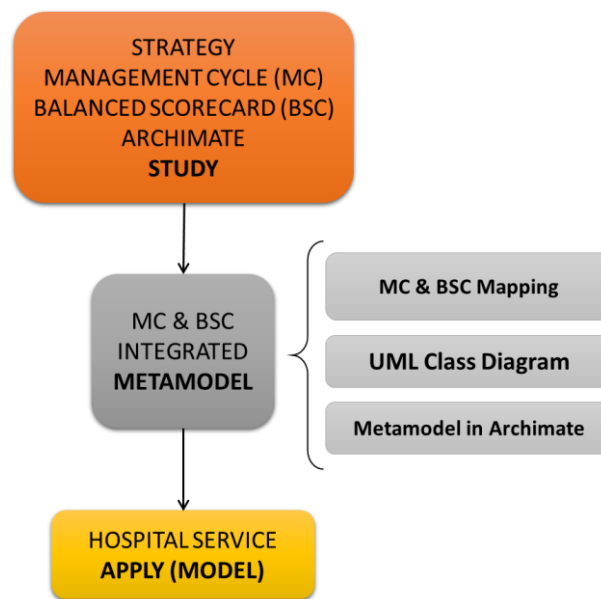


Figure 1 - Dissertation organization.

To answer to the problem defined it was created a schema presented in Figure 1 that starts with the study of the four main themes, Strategy, Management Cycle (MC), Balanced Scorecard (BSC) and ArchiMate. Then, it is time to create the BSC metamodel in ArchiMate, and for that, it has created (i) a diagram of the understood link between the MC and the BSC; (ii) a UML (a modeling language already known) class diagram of the same link; and (iii) the proposed metamodel in ArchiMate. Moreover, finally, the last part was made an example of the application of the BSC to an organization in the health sector, creating the instance of the metamodel (a model), presented in chapter 3. With intent to understand if the ArchiMate is a good modelling language to help/simplify the application of the BSC to an organization.

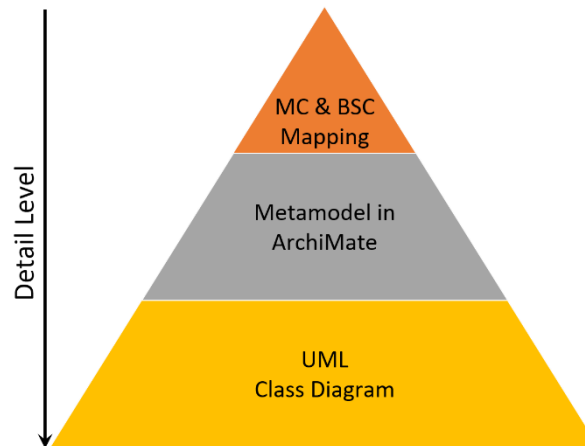


Figure 2 - The three developed levels of the Metamodel.

In Figure 2 is presented three layers of the metamodel, from the most generic (top) to the most specific (bottom). To create a metamodel in ArchiMate, the author started by design a diagram of the understood link between the MC (processes, frameworks, tools, and data, to develop, implement and control the strategy) and the BSC. This generic diagram will be presented in section 4.1. In section 4.2, was modeled a UML class diagram of the same link because it was a modelling language already known, with the aim of realize which concepts or tools should be included in the final matemodel in ArchiMate. The proposed metamodel in ArchiMate created is presented in section 4.3.

1.3 Objectives and Research Questions

A big number of organizations already “recognize that competitive advantage comes more from the intangible knowledge, capabilities, and relationships created by employees rather than investments in physical assets and access to capital.” say Kaplan and Norton (2001). As such, the use of financial measures to monitor and control business is not enough. More and more, additional measures from the point of view of the customer, internal processes, organization, and employees are needed.

That way, they should apply the BSC (presented in the early 90s by the same authors of the MC), a framework used in the second stage of the MC to measure and provide feedback to organizations with the objective of driving performance. This framework should translate a business’s strategy into tangible objectives and measures that give to the managers a fast but comprehensive view of the firm performance.

Implement a BSC is hard work. To achieve better results, it is advisable to have a team just focused on the strategy improve (develop, implement and control) where they should use the different tools, including the BSC. In this scope, this work intends to test if the ArchiMate modeling language can help to implement this process.

To ensure the achievement of positive results, the following goals were defined throughout the project:

- Match the strategic objectives with the ArchiMate elements;
- Understand if ArchiMate can help to apply the BSC to an organization.

To achieve these main goals, the following objectives were also accomplished:

- Understand what Strategy is and how that can be developed and implemented;

- Know what the BSC is and how to apply it;
- Comprehend the link between the MC and the BSC;
- Understand the ArchiMate modeling language;
- Model in ArchiMate a metamodel of the integrated BSC;
- Create an instance of that metamodel in a hospital service.

The research questions that will guide this study are:

- What is Management Cycle (MC) and the Balanced Scorecard (BSC) and what are they used for?
- How are they organized? How do they relate?
- What is ArchiMate and what is it used for?
- What is a metamodel? What's the difference for the model?
- How to relate strategic concepts to ArchiMate?
- How to model a BSC metamodel in ArchiMate?
- How to apply the created metamodel, to a health care institution?

1.4 Research Methodology

Design Science Research Methodology (DSRM) is used in this study. Design science is an outcome-based information technology research methodology, which offers specific guidelines for evaluation and iteration within research projects. Design science research focuses on the development and performance of artifacts with the explicit intention of improving the functional performance of an artifact. In design science research, as opposed to explanatory science research, academic research objectives are of a more pragmatic nature. Studies in these disciplines can be seen as a quest for understanding and improving human performance.

According to Van Aken (2005), the main goal of design science research is to develop knowledge that the professionals of the discipline in question can use to design solutions for their field problems. This mission can be compared to one of the 'explanatory sciences,' like the natural sciences and sociology, which is to develop knowledge to describe, explain and predict (Aken, 2005). Hevner et al. (2004) state that the main purpose of design science research is achieving knowledge and understanding of a problem domain by building and application of a designed artifact.

Hevner et al. (2004) have presented a set of guidelines for design science research within the discipline of Information Systems. Design science research requires the creation of an innovative, purposeful artifact for a particular problem domain. The artifact must be evaluated to ensure its utility for the specified problem. With a view to form a novel research contribution, the artifact must either solve a problem that has not yet been solved or provide a more effective solution. Both the construction and evaluation of the artifact must be done rigorously, and the results of the research presented effectively both to technology-oriented and management-oriented audiences (Hevner, et al., 2004)

Hevner (2004) presents seven guidelines for a design science research:

Activity 1: Problem identification and motivation. Define the specific research problem and justify the value of a solution to motivate the researcher and the audience of the research to pursue the solution and to accept the results. Resources required for this activity include

knowledge of the state of the problem and the importance of its solution. After the problem is identified, there remains the step of determining the performance objectives for a solution.

Activity 2: Define the objectives for a solution. Infer the objectives of a solution from the problem definition and knowledge of what is possible and feasible. The objectives can be quantitative, such as terms in which a desirable solution would be better than current ones, or qualitative, such as a description of how a new artifact is expected to support solutions to problems not hitherto addressed. The objectives should be inferred rationally from the problem specification. Resources required for this included knowledge of the state of problems and current solutions, if any, and their efficacy.

Activity 3: Design and development. Create the artifact. Such artifacts are potentially constructs, models, methods, or instantiations or “new properties of technical, social, and informational resources”. Conceptually, a design research artifact can be any designed object in which a research contribution is embedded in the design. This activity includes determining the artifact’s desired functionality and its architecture and then creating the actual artifact. Resources required for moving from objectives to design and development include knowledge of theory that can be brought to bear in a solution.

Activity 4: Demonstration. Demonstrate the use of the artifact to solve one or more instances of the problem. That could involve its use in experimentation, simulation, case study, proof, or other appropriate activity. Resources required for the demonstration include effective knowledge of how to use the artifact to solve the problem.

Activity 5: Evaluation. Observe and measure how well the artifact supports a solution to the problem. This activity involves comparing the objectives of a solution to actual observed results from use of the artifact in the demonstration. It requires knowledge of relevant metrics and analysis techniques. Depending on the nature of the problem venue and the artifact, the evaluation could take many forms. It could include items such as a comparison of the artifact’s functionality with the solution objectives from activity 2, objective quantitative performance measures such as budgets or items produced, the results of satisfaction surveys, client feedback, or simulations. It could include quantifiable measures of system performance, such as response time or availability. Conceptually, such evaluation could include any appropriate empirical evidence or logical proof. At the end of this activity, the researchers can decide whether to iterate back to activity 3 to try to improve the effectiveness of the artifact or to continue to communicate and leave further improvement to subsequent projects. The nature of the research venue may dictate whether such iteration is feasible or not.

Finally, the same authors. Proposed the need for communication to diffuse the resulting knowledge. (Aken, 2005) (Hevner, et al., 2004)

Activity 6. Communication. Communicate the problem and its importance, the artifact, its utility and novelty, the rigor of its design, and its effectiveness to researchers and other relevant audiences such as practicing professionals, when appropriate. In scholarly research publications, researchers might use the structure of this process to structure the paper, just as the nominal structure of an empirical research process (problem definition, literature review, hypothesis development, data collection, analysis, results, discussion, and conclusion) is a common structure for empirical research papers. Communication requires knowledge of the disciplinary culture.

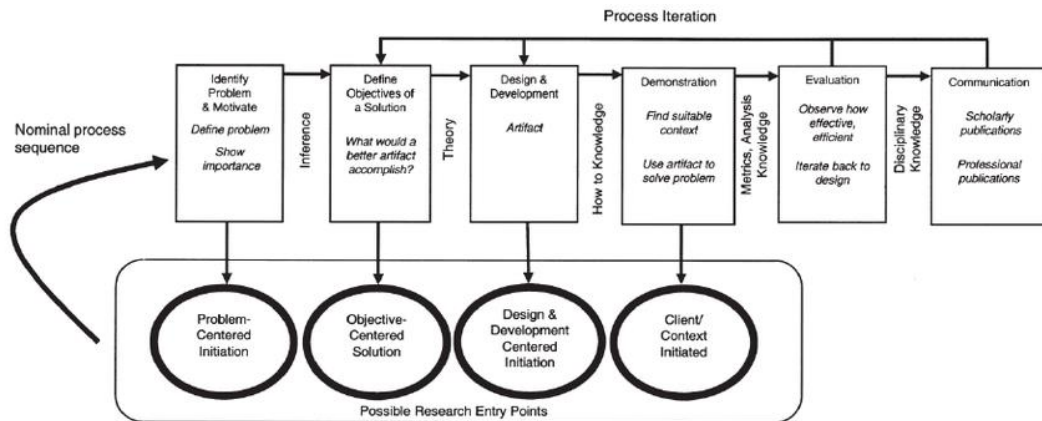


Figure 3 - Design Science Research Methodology Process Model (Peppers, et al., 2008)

The final objective of a DSRM process is to provide a mental model for the characteristics of research outputs. A mental model is a small-scale model of reality that can be constructed from perception, imagination or the comprehension of discourse. Outcomes from DS research are expected to differ from those of theory testing or interpretative research. A process model should provide some guidance, as reviewers, editors, and consumers, about what to expect from DS research outputs contributed to this expectation with their ideas about research outputs further elaborated on this expectation by describing DS research's essential elements. A mental model for the conduct and presentation of DS research will help researchers to conduct it effectively. (March & Smith, 1995) (Hevner, et al., 2004)

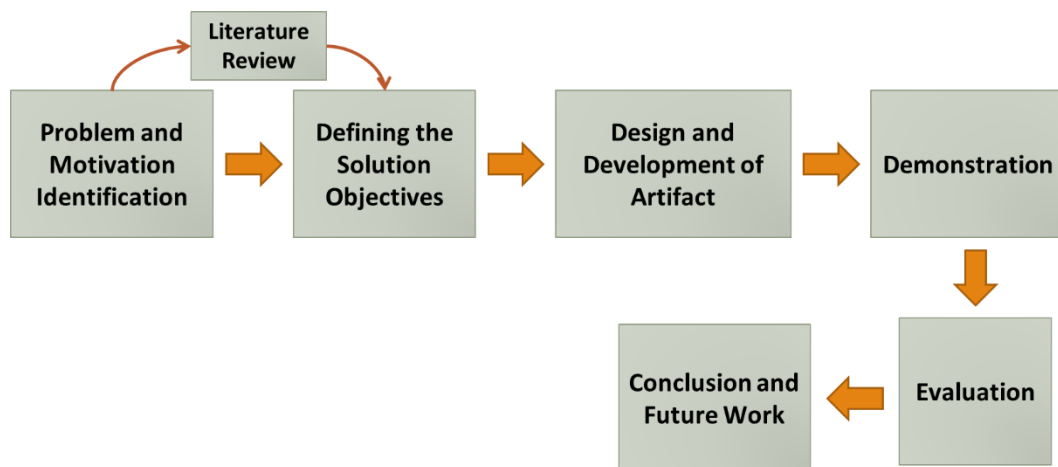


Figure 3 – Methodology diagram adapted to this thesis.

Adapting this methodology to this thesis, we can see in Figure 3 the diagram generated, where it is divided in six steps. It was added the step of literature review necessary to the definition of the objectives and to the development of the artifact. The last step, Communication that aims to publish the work developed was replaced by Conclusion and Future work.

1.5 Report Structure

This dissertation is divided into seven chapters. The structure reflects the methodology adopted, described in the previous section, encompassing and summarizing the content of the main artifacts produced throughout the study. Chapter 1, is an introductory chapter so that the reader understands the objectives and methodology adopted. So, it begins with the presentation of the context, motivation, description of the problem, objectives, research questions, methodology and the organization of the document.

Chapter 2, makes a reference to the most relevant themes for a possible understanding of the concepts used such as: Strategy (ST), the Management Cycle (MC) and six stages that make it up and the Balanced Scorecard (BSC). Chapter 3, presents a brief description of Models and Metamodels and the Modelling Languages used (UML and ArchiMate).

Chapter 4 presents the diagram of the linkage of MC and BSC and the two metamodels designed in UML and ArchiMate modeling languages. This chapter also includes the matches between concepts of the frameworks and the modeling languages. Chapter 5 shows a brief presentation of the industry and the organization chosen to demonstrate the artifact; shows the business strategy analysis, the change agenda, the strategy map and the BSC of that organization; and the metamodel instance (model).

Chapter 6 contains the results evaluation, where it presents the analysis of what is done, some proper justifications and comments highlighting which went less well and presents some advantages and disadvantages of the proposed solution. This chapter is divided into two sections, Thesis Proposal, and Demonstration. The final chapter (7), is presented the conclusion of this study, i.e., understand whether the proposed implementation achieved the proposed objectives at the outset or not and is divided into two parts, one with the summary and conclusion of the work and other with the future work proposals.

According the methodology adapted to this thesis, presented in the previous chapter, the first step, Problem and Motivation Identification, is represented in the first chapter section 1.1 and 1.2. The Literature Review is presented in chapters 2 and 3, Definition of the Solution Objectives in section 1.3. The fourth step, Design and Development of Artifact is presented in chapter 4 and the Demonstration in chapter 5. Evaluation is in chapter 6 and Conclusion and Future Work in chapter 7.

2 Strategy and Management Cycle

“Successful strategy execution has two basic rules: understand the management cycle that links strategy and operations, and know what tools to apply at each stage of the cycle.”

Robert S. Kaplan and David P. Norton (Kaplan & Norton, 2008)

The strategy is a long-term management action plan for running and growth the business, attract and please customers, conducting operations, compete successfully, and achieve target levels of organizational performance through the control of results. It Consists of a set of aggressive moves, methods, actions, ways, business approaches goals and policies to achieve the strategic objectives and improve the organization performance. The process of the strategic management is a job of top level management to plan the course of an entire enterprise. The main goal of an organization is to achieve a superior performance (competitive advantage) comparing to other players and adapting to the market fluctuations. To understand an organization strategy, the question that needs to be answered is: “Where we are going and Why?”. (Beirão & Patricio, 2009-2015) (Paules, 2011)

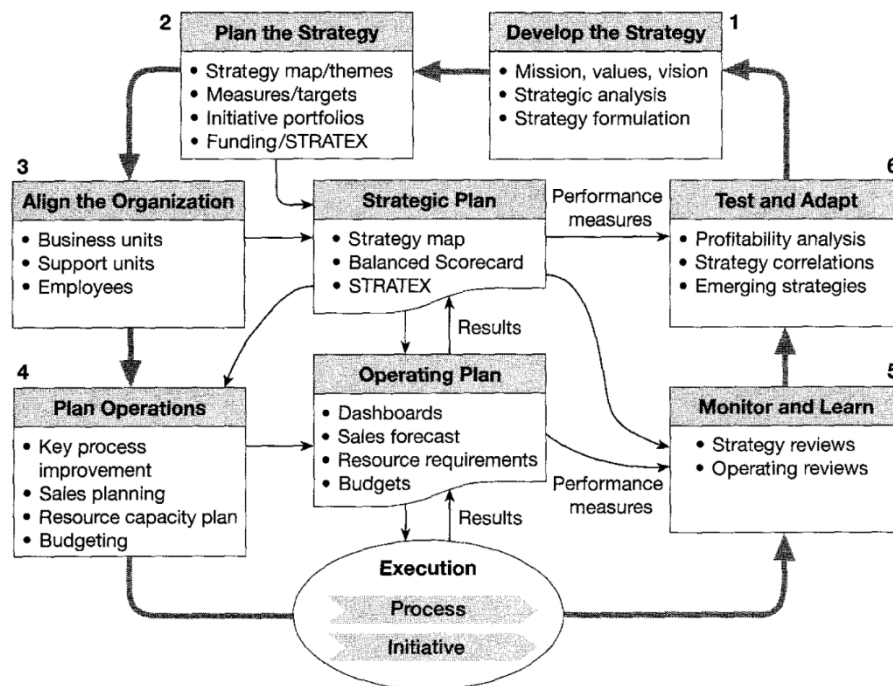


Figure 4 – Kaplan & Norton Management Cycle (MC). (2008)

Most of the companies just see strategy as a sentence with the general goal of the organization while a global vision and particular path to plan, implement and control the strategy must be created. To do that, Kaplan and Norton (2008) present the Management Cycle framework (MC) (see Figure 4) that describes how to link strategy and operations in a six-stage system. To help the organizations, more than formulate, plan, implement, monitor, control, test and adapt the strategy, in order to create or improve a competitive advantage. (Kaplan & Norton, 2008)

2.1 MC First Stage

In the first stage, managers develop a strategy using the tools of the business strategy analysis of the external and internal environment. The development of the strategy can have two

different contributors: the top managers and the middle-level managers. Three questions must be answered:

- “What business are we in, and why?”, the strategy development starts with the purpose of the organization translate by the Mission, the Values that guide its actions and the perspective of results translated by the Vision. These three statements (MVV statements) establish guidelines to the strategy formulation and implementation.
- “What are the key issues?”, To answer this question is needed to conduct a strategic analysis. This part is important because will help us to understand the current situation (internal and external) needed to the Strategic Change Agenda analysis, which brings together a set of guidelines that explains the need for the changes in the strategy.
- “How can we best compete,” to answer this question a strategy formulation is required to resolves the issues and establishes the new directions. To accomplish with it, the following issues should be addressed: identify niches to compete, develop customer value proposition by niche, define differentiated key processes, identify human capital capabilities and respective technology enablers. (Kaplan, et al., 2008)

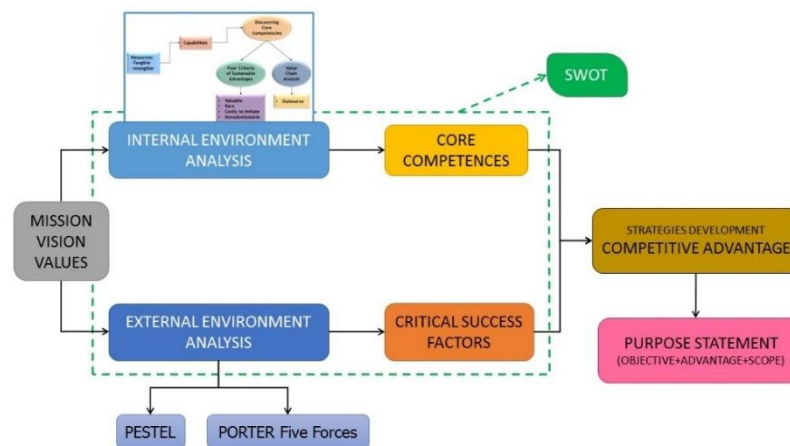


Figure 5 - Business Strategy Analysis diagram.

Regarding the work presented in this dissertation, it is important to focus on question 2, in order to understand the concepts, methods, and tools used during the work. In the first sub-section is present the business strategy analysis (see Figure 5) and then in second sub-section is the Strategic Change Agenda (CA) represented in Table 3.

2.1.1 Business Strategic Analysis

The business strategy analysis starts with the definition of mission, vision and values (MVV), then have two courses, the external environment analysis and the internal environment analysis. Starting by the external it is used:

- The PESTEL analysis, a tool used by marketers to analyze and monitor the external marketing environment factors, that have an impact on the organization, and is composed of six dimensions in the broader society that influence an industry and the firms. The main point of PESTEL analysis is the identification of opportunities and threats that will be input for SWOT analysis.

Those six dimensions are:

- Political Dimension, that is how and to what degree a government intervenes in the economy or a certain industry;

- Economic Dimension presents the factors that will determinate a certain economy's performance;
- Social that represents the demographic characteristics, norms, customs and values of the population within which the organization operates;
- Technological Dimension, these factors relate to innovations in technology that may affect the operations of the industry and the market favorably or unfavorably;
- Environmental Dimension, these factors have become important due to the increasing scarcity of raw materials, pollution and carbon footprint targets set by governments;
- Legal Dimension, these factors include more precise laws, the companies need to know what is and what is not legal to trade successfully and ethically.



Figure 6 - Porter's Five Forces. (Business-to-you, n.d.)

- Porter's Five Forces presented in Figure 6, consist in a simple but powerful tool for understanding where power lies in a business situation. This framework is useful because it helps to determine how competitive industry is and contribute to recognizing both, the strength of their current competitive position, and the power of a position that an organization is considering moving into. This framework it is based on five different factors: the rivalry among existing competitors, the threat of new entrants (potential competitors), the threat of substitute products (alternatives), the bargaining power of suppliers, and the bargaining power of buyers. If these forces are strong, competition can be considered high. (Mind Tools, 1996-2017) (Business-to-you, n.d.)

Still in the external analysis course, the Critical Success Factors (CSF's) idea was first presented in the 1960s to help businesses implement their strategies and are the essential areas of activity that must be performed well to achieve the mission and the strategic objectives. As John F. Rockart (1996-2017), of MIT's Sloan School of Management, conclude, CSF's are "areas of activity that should receive constant and careful attention from management" (1996-2017). In sum, CSF's represents factors that are either particularly valued by customers or which provide a significant advantage regarding cost; those are a major source of competitive advantage. (Professional Academy, 2002-2017) (Business-to-you, n.d.) (Sood, 2011)

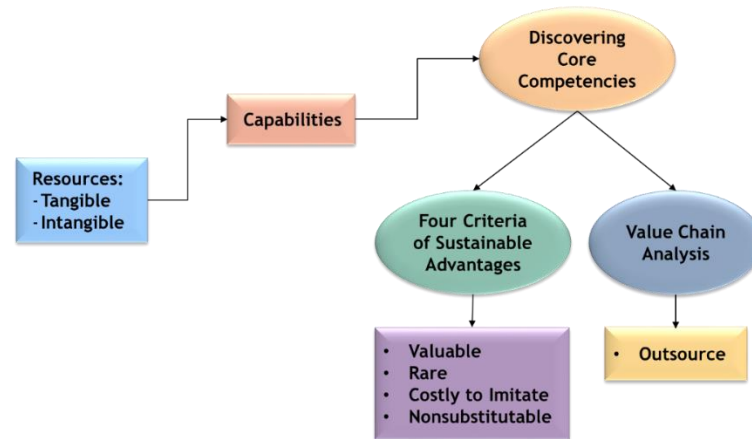


Figure 7 - Internal environment analysis diagram.

The internal environment analysis is detailed in Figure 7, is divided in three parts:

- The first, gathering the **Resources**, assets that organizations have or can call upon, including people and the value of its brand name, they are the source of a firm's capabilities and represent inputs into a firm's production process. Those can be divided into two types, Tangible Resources, the ones that are material or substantial, that encompass the Financial, the Physical, the Technological and the Organizational Resources; and the Intangible Resources, the ones that are more difficult for competitors to copy, that include the Human, the Innovation and the Reputational Resources. (Beirão & Patricio, 2015/2016) (Sood, 2011)
- Second, identify the **Capabilities**, divided by functional area: Corporate Function, Management Information, Research and Development, Operations, Marketing, Sales and Distribution and Product or Service. The capability is what an organization does, is the way how the resources are used or deployed effectively; this emerges over time through complex interactions among tangible and intangible resources; And often it is based on the development and exchange of information and knowledge through the human capital of the company. (Beirão & Patricio, 2015/2016) (Sood, 2011)
- And third discovering the **Core Competences**, which is the set of skills, activities and resources linked, that offer value to the customer, differentiate a business from its competitors and can be developed so the market change or new opportunities appear. Are what an organization does that is strategic valuable, are the resources and capabilities that serve as a source of a firm's competitive advantage, which distinguish a company competitively and reflect its personality, that emerge over time through an organizational process of accumulating and learning how to deploy different resources and capabilities. To achieve the Core Competences, we need to use two tools:
 - VRIN the Four Criteria of Sustainability Advantage (see Figure 8) - Resources must be valuable, and they are considered valuable when they enable a firm to implement strategies that improve a company's efficiency and effectiveness by exploiting opportunities or by mitigating threats. For companies transform these resources into sustainable competitive advantage, these must have four attributes that can be summarized into the VRIN framework: Value, that is what helps a firm neutralize threats or exploit opportunities; Rarity, represented by the aspects that are not possessed by many others; Inimitability, represented by the historical, a unique and a valuable organizational culture or brand name, an ambiguous cause, causes and uses of a competence is unclear, social complexity,

interpersonal relationships, trust, and friendship among managers, suppliers, and customers; and Non-substitutability that represents no strategic equivalent. (Business-to-you, n.d.)

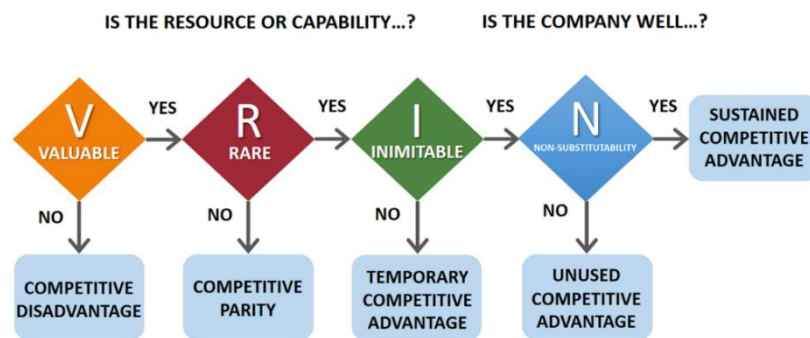


Figure 8 - VRIO explained diagram. Adapted from (Business-to-you, n.d.)

- Value Chain (see Figure 9) - This tool describes the classes of activities within an organization which together, create a product or a service. It is an analytical tool that describes all activities that make up the economic performance and capabilities of the firm, which allows the firm to understand the parts of its operations that create value and those that do not. The value chain is a template that companies use to understand their cost/price position across the value network to identify multiple means that might be used to facilitate implementation of a chosen business-level strategy.

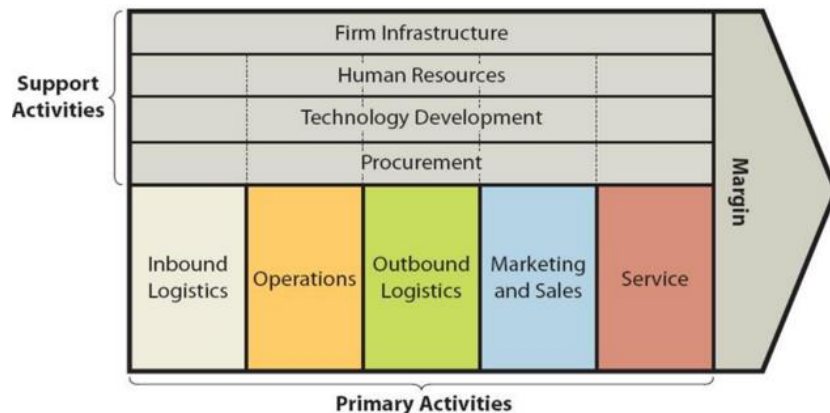


Figure 9 - Value Chain diagram. (Dudovskiy, 2016)

After finishing the external and internal analysis, achieve the Core Competences and the CSF's, it is time to the SWOT analysis (see Figure 10). Is a business tool that helps to assess a wide variety of factors that may have a profound impact on a company's performance. This factors can be internal or external, favorable or unfavorable, creating this way a four quadrants framework presented in: Strengths, Weaknesses, Opportunities, and Threats, with the objective of produce or help to producing realistic and achievable goals. (Business-to-you)



Figure 10 - SWOT analysis diagram. Adapted from (Business-to-you, n.d.).

To finish the strategy analysis, we need to present Porter's Generic Strategies. It describes how a company pursues competitive advantage by positioning itself in between its competitors. As shown in Figure 11, there are four strategies for competitive advantage: Cost Leadership, Differentiation, Cost Focus and Differentiation Focus. There are two types of competitive advantage, the Low Cost, and the Differentiation; and two types of scope can be total or narrow (Niche Market).

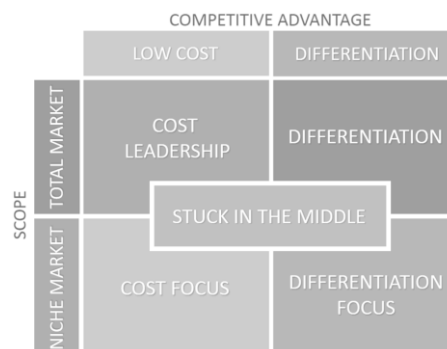


Figure 11 - Porter's Generic Strategies diagram. Adapted from (Business-to-you, n.d.)

As the authors of the website Business-to-you well explain, "A company chooses to pursue one of two types of competitive advantage, either via lower costs and thus a lower price or by differentiating itself along dimensions valued by customers to command a higher price. A company also chooses one of two types of scope, either focus (offering its products to selected segments of the market) or industry-wide, offering its product across many market segments. Combined these strategies offer four potential ways of companies to position themselves. Companies that try to excel in all of these ways would end up somewhere 'stuck in the middle', according to Porter. " (Business-to-you, n.d.)

The final step is to define the Purpose Statement, a written declaration of an organization's core purpose and focus that is composed by an objective, an advantage and by the scope. (WebFinance Inc, 2017)

2.1.2 Change Agenda

The Change Agenda (CA) compares the current situations of several organizational structures, capabilities, and processes with what they need to become over the next three to five years. Those situations must be divided by scope, presented by the areas that where the change should be implemented. The CA is where it study the current situation and the things that need to be modified in the future, a list of what needs to be changed to carry out the organization's purpose. Used to provide motivation for why transformational change is necessary. With this, managers

select a specific course of action to achieve the vision's targets. (Beirão & Patricio, 2015/2016) (Business-to-you, n.d.) (Sood, 2011)

2.2 MC Second Stage

In the second stage, the organization plans the strategy using tools such as Strategy Map (SM) and the Balanced Scorecard (BSC).

2.2.1 Strategy Map

After the BSA and the gathering of the needs to be changed (in CA), can be extracted the strategic objectives (SOs) by perspective and created a cause-effect linkage between those, that facilitates the communication of direction and priorities across the enterprise. The SM describes how an organization can create sustained value for its shareholders, customers, and communities and consists in a framework that aim to align processes, people, technology, and culture to the customer value proposition and shareholder objectives. (Kaplan & Norton, 2008) (Kaplan & Norton, 2004)

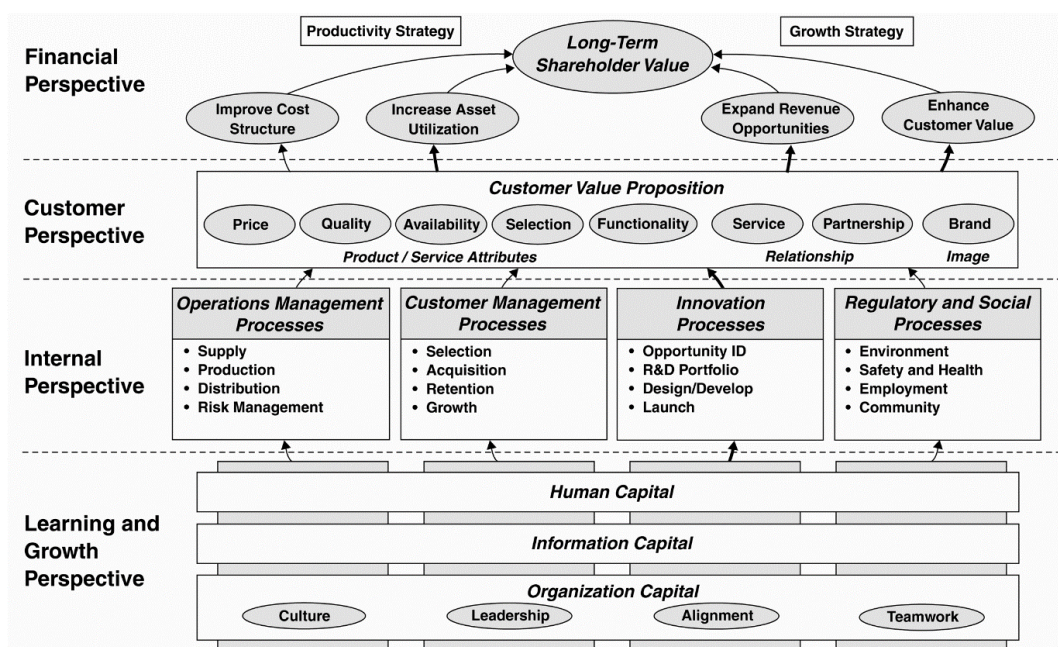


Figure 12 - Strategy Map template by Kaplan and Norton. (2004)

It is a visual framework (see Figure 12) of the cause-effect flow among the components of an organization's strategy, and it is used to integrate the four perspectives of a BSC. A perspective is a part of the organization that it need to be changed. It provides a uniform and consistent way to describe strategy. (Kaplan & Norton, 2008) (Kaplan & Norton, 2004)

The SM is shown as, a powerful tool for visualizing the strategy, an integrated view of strategy and a path to success. How Kaplan and Norton (2008) explains, this chain starts with the company's long-term financial objectives (typically, 15 to 25) and then links down to objectives for customer loyalty and the company's value propositions. Moreover, it links to goals related to critical processes and, ultimately, to the people, the technology, and the organizational climate and culture required for successful strategy execution. So, a strategy map can reduce a complex strategy statement to a single page. (Kaplan & Norton, 2004)

A large corporation can create an overall corporate strategy map and then other strategy maps for each of its operating and functional units. A good strategy map should identify key "landmarks" such as financial constraints and customer expectations to communicate their

strategic plan clearly. It also identifies the specific capabilities in the organization's intangible assets that are required for delivering exceptional performance in critical internal processes. (Kaplan & Norton, 2008) (Kaplan & Norton, 2004)

The Strategy Map (SM) is linked to the BSC through the strategic objectives and perspectives. Is in SM that is supposed to gather the strategic objectives and trace a cause-effect linkage between those objectives. Those objectives should be divided in four Perspectives:

- **Financial Perspective (FP)** - If we succeed, how will we look to our stakeholders?
- **Customer Perspective (CP)** - What do our customers expect from us?
- **Internal Business Processes Perspective (IPP)** - To satisfy our customers, at which processes must we excel?
- **Learning and Growth Perspective (LGP)** - To be successful, how must our organization learn and improve?

Strategic themes are the main, high-level business strategies that form the basis for the organization's business model, and they are part of the strategic planning work of building a BSC. Strategic themes provide structure, support, and boundaries, as well as define business strategies and business model and can be seen as pillars of excellence. (Kaplan & Norton, 2001) (Perry, 2011) (Rohm & Montgomery, 2011)

“The strategic themes are very broad in scope. They apply to every part of the organization and define what major strategic thrusts the organization will pursue to achieve its vision.” (Perry, 2011). Themes affect all four of the SM perspectives (financial, customer, internal process, organizational capacity). Developing strategic themes requires deliberations of other strategic elements, such as the challenges, customer value proposition, and other components of the strategic assessment work. They also represent deliberate strategic directional decisions made by the leadership team. (Perry, 2011) (Rohm & Montgomery, 2011)

Strategy Maps provide a foundation to building BSCs linked to an organization's strategy.

2.2.2 Balanced Scorecard

Balanced Scorecard (BSC) is a performance metric used to measure and provide feedback to organizations. It is used in strategic management to identify and improve various internal functions of a business and their resulting external outcomes. Data collection is crucial to provide quantitative results since the information collected is interpreted by managers and executives in order to make better decisions for the organization. This subject will be presented in more detail in next section. (Kaplan & Norton, 1996) (Kaplan & Norton, 2008)

2.3 MC Other stages

The **third stage** encompasses the alignment of the organization with the strategy by cascading linked SM's and BSC's to all organizational units. Managers align employees through a formal communication process and link employees' objectives and incentives to strategic objectives. (Kaplan & Norton, 2008)

The **stage 4** is related to Plan Operations. “Managers can now plan operations using tools such as quality and process management, reengineering, process dashboards, rolling forecasts, activity-based costing, resource capacity planning, and dynamic budgeting.” (2008)

Stage 5, Monitor & Learn, integrates information about operations and strategy, in a carefully designed structure of management review meetings. It presents how the strategy and operational plans are executed, how the enterprise answer to problems, barriers, and challenges. (Kaplan & Norton, 2008)

In the **sixth stage**, Test and Adapt the Strategy, managers use internal operational data, new external environmental data and competitive data to test and adapt the strategy, launching another loop around the “integrated strategic planning and operational execution system” (Kaplan & Norton, 2008).

2.4 The Balanced Scorecard

“Better performance starts with better information.”

(ClearPoint Strategy, 2016)

Presented by Robert S. Kaplan and David P. Norton from Harvard Business School in the early 1990s in an article “The Balanced Scorecard – Measures that Drive Performance” (1992) (see Figure 13). BSC is a performance management tool, that is used in stage two (plan the strategy) of MC.



Figure 13 – Kaplan and Norton BSC Publications.

Financial measures worked well in the industrial era, but in this new service and data era is not enough. Now, it is a time for more revolutionary services, organizations that require new capabilities to competitive success and the ability of a company to mobilize and exploit its intangible assets. Although traditional methods of measuring performance focused on financial indicators, there were already some that used non-financial indicators. However, the BSC is different from them because, although the financial aspects continued to be important nowadays, is not an only financial performance that leads to a successful business. (Kaplan & Norton, 1992)

No single measure can provide a clear performance target or focus attention on the critical areas of the firm. The intangible assets such as customer satisfaction, product/service quality, skilled employees or reliable services are equally important and cannot be seen regarding financial numbers by employees, customers, shareholders or the community to the real worth of a company or enterprise.

BSC “is a widely used high-level technique for strategic performance management of organizations. It provides four perspectives on performance and addresses these in a layered structure using (..) objectives, measures, targets, and initiatives to express the strategic direction. Strategy maps are often used as a depiction of these elements and their relationships.” (2017)

“What you measure is what you get.”

(Kaplan & Norton, 1996)

This framework emphasizes that financial and nonfinancial measures are all part of a system that gives information to every part of the organization. It balanced the outcome measures, from past interventions and measure that drives future performance. To accomplish critical management processes, such as: (i) simplify and explain the vision and the strategy; (ii) link strategic objectives and measures; (iii) plan and determine targets; (iv) align strategic initiatives; and (v) enhance strategic feedback and learning.

By allowing to control if objectives of the company are being met through monitoring the staff and the execution of planned activities, BSC allows managers to see how well their businesses are being run. As Professional Academy (2002-2017) highlights, for a business to succeed objectives must establish, in line with the overall mission and vision. The BSC suggests that it is not an only financial performance that equates to a successful business. So it uses perspectives of four different areas of the organization and monitors their performance based on their objectives. (Professional Academy, 2002-2017)

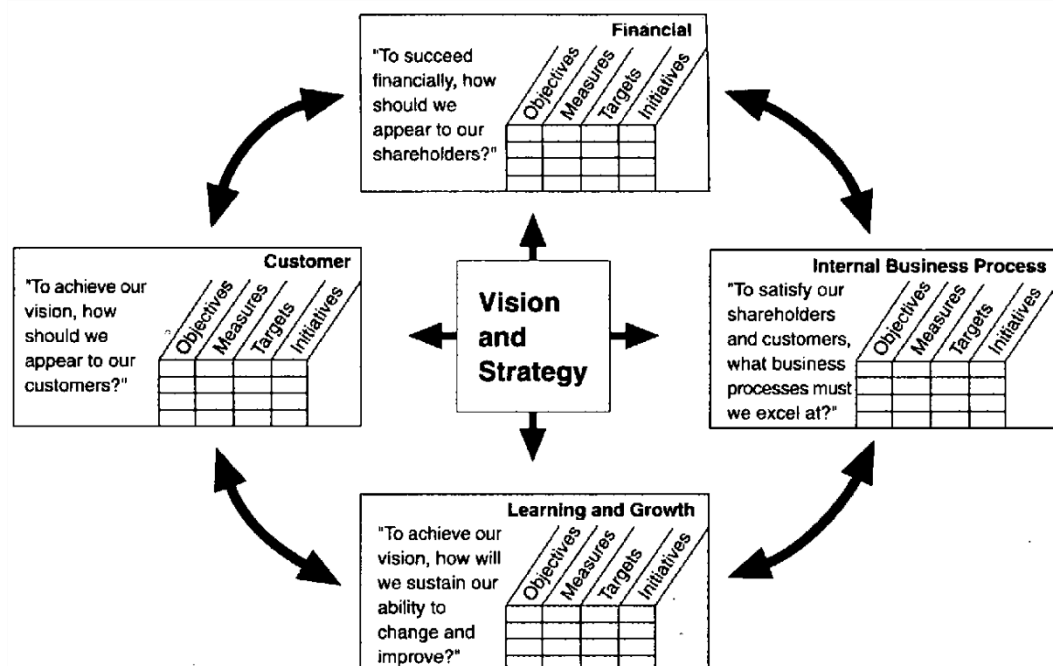


Figure 14 - Balanced Scorecard framework. (Kaplan & Norton, 1996)

The BSC should be developed in the organizations because it has the power to:

- clarify and gain consensus about vision and strategy;
- build a management team;
- communicate the strategy;
- link reward to achieving strategic objectives;

- set strategic targets;
- aligning resources and strategic initiatives;
- sustain investment in intellectual and intangible assets;
- provide a foundation for strategic learning;
- see how the business is running;
- see if the objectives of the company are being met;
- make better decisions about the strategy and quantitatively evaluate its execution.

(Kaplan & Norton, 1992) (Kaplan & Norton, 1996) (Chavan, 2009)

The framework should translate a business's strategy into tangible objectives and measures that give the managers a fast but comprehensive view of the firm. To achieve this, the BSC is divided into four general perspectives (see Figure 14) that cover the main strategic focus areas of a company and monitors their performance based on their objectives. (Kaplan & Norton, 1996) These four perspectives are:

- I. The Learning and Growth Perspective is related with how will an organization sustain the ability to change and improve to achieve its vision. This point of view involves staff learning, training to improve the knowledge resources, capacity to introduce new products, create more value for customers, and improve operating efficiencies. It focuses on how to educate employees, how to gain and capture the knowledge, and how to use it to maintain a competitive advantage within the market innovation & improvement activities. (Kaplan & Norton, 1992) (Kaplan & Norton, 1996)

Managers must be able to identify where they should be investing their funds for personal development, not just through training but mentor schemes and improving communication amongst staff. A company's ability to innovate, improve and learn ties directly to the enterprise's value. The measurement includes: Job satisfaction, Employee turnover, levels of specialist knowledge and skills and Training opportunities. (José Romão de Sousa, 2016/2017) (Professional Academy, 2002-2017)

- II. The Customer Perspective is about how costumers see the organization and how should an organization appear to its potential costumers. It involves measuring lead times, quality, performance, and service, and costs, measure the customer satisfaction, their performance requirements for the organization and the goods/services. Many companies have a corporate mission that focuses on the client, and the organization performance from the customer's perspective has become a priority for top management. In the BSC, top managers need to translate this behavior into specific measures that reflect the factors that matter to the customers, such as, time, quality, performance and service, and cost. Significant measures are:

- Lead-time – the time that the company requires answering to customer needs. (from the time that the company receive an order to the time that delivers the product or service to the client):
- Time-to-market – from definition stage to shipping.
- Quality – measures the defect level of incoming products as perceived and measured by the customer.
- Performance and Service – how the company's products or services contribute to creating value for its customers.
- Cost, Customer satisfaction rate, Customer retention, Delivery performance and Quality performance

(José Romão de Sousa, 2016/2017)

- III. Internal Business Process Perspective focuses on how to satisfy shareholders and customs and what business processes must an organization excel. This perspective “involves determine the processes and competencies that are most critical, and specify measures, such as cycle time, quality, employee skills, and productivity to track them.” (1992) These measures link top management's judgment about key internal processes and competencies for the actions taken by individuals that affect overall corporate objectives. (Kaplan & Norton, 1996) (ClearPoint Strategy, 2016)

These measures permit managers to see how well their business is, based on whether their products and services are answering the needs of their customers. The measurement includes activities per function, process alignment, and process automation. (Chavan, 2009)

- IV. Financial Perspective relates to how do the organization look to the shareholders. This point of view involves measurement of cash flow, quarterly sales growth, operating income by division, and increased market share by segment and returns on equity. As well as track the financial requirements and performance. Moreover, if the organization's strategy, implementation, and execution are contributing to the bottom-line improvement. (José Romão de Sousa, 2016/2017)

For each perspective of the BSC four things should be monitored:

- **Strategic Objective (SO):** primary objective to be achieved, for example, profitable growth.
- **Measure (M):** the observable parameter “that will be used to measure progress toward reaching the objective. For example, the objective of profitable growth might be measured by growth in net margin.” (whatishumanresource.com, n.d.)
- **Target (T):** the specific target value for the measure, for example, 7% annual decline in manufacturing disruptions.
- **Initiative (I):** project or action to be initiated to meet the objective.

(whatishumanresource.com, n.d.)

When applying BSC, it is important to:

- achieve the purpose statement
- identify the pain points and creating good points
- improve the performance
- align and focusing the resources on strategy
- “clarify, simplify, and then operationalize the vision at the top of the organization,” (1992) using “a short list of critical indicators of current and future performance.” (1992)
- plan, implement and achieve the business strategies by setting and achieving the strategic goals and objectives to the organization
- achieve better-quality processes and customer satisfaction, more motivated staff and clear positive financial results
- measuring the performance of a business

(Kaplan & Norton, 1992) (José Romão de Sousa, 2016/2017) (Professional Academy, 2002-2017) (ClearPoint Strategy, 2016) (Kaplan & Norton, 1996)

A BSC is only possible if already exists an organizational strategy in place; it simply acts as a “strategy holder.” To start implementing this framework data must be collected, such as MVV, problems, threats, opportunities and future changes extracted through the Business Strategy Analysis (BSA) and the strategy Change Agenda (CA). Then the Strategic Objectives (SO) must be defined, with the implementation of the Strategy Map (SM). Then the Measure (M) should be chosen and settled a value for the Target (T) (for each measure). Should be shaped some corrective actions (Initiatives (I)) to be implemented, then data must be collected (periodical measurement), and at last, gathered data should be compared with the value of the T settled to understand if the SO was reached and how much time was needed. (Professional Academy, 2002-2017)

This framework is designed in a way that can be applied to any business areas since those have pre-defined strategic goals. However, it has needed a total commitment of the leadership team to a correct implementation and can be used for short, mid and long-term performance measures. (ClearPoint Strategy, 2016)

In some cases, there is not just one BSC for all organization but several for different departments or business units to simplify the implementation and also encourage cross-departmental communications and the sharing of information that will benefit everyone. This framework simplifies the strategy implementation since it minimizes the overload data by limiting the measures used and forces managers focus on the most critical measures. Beyond that, this framework provide managers with the tools they need to navigate to future competitive success. (Professional Academy, 2002-2017)

3 Models and Metamodels

A model is an image, a drawing or a scheme, a simplified representation of a part of reality, of behavior, a phenomenon or set of phenomena, aiming to communicate objectively, test hypothesis and predict the performance of a real system. A model is any representation which can help a stakeholder answer to a question about a system. Is modeled information about concrete and abstract objects, relations, processes, events, actors, operations, roles, and others. A conceptual model should be technologically neutral, capture the language of the business, flexibly and robustly to represent general concepts. (Génova, 2009) (Porto Editora, 2003-2017) (Assar, 2012) (Dias & Borges, 2015-2016)

Models are important to support the change. They, create transparency, communicating in a clear and unambiguously way; facilitate alignment, creating coherence of strategy, architecture, design or realization; and inform decision making, perform cost calculations, manage portfolios, assess risk and analyze dependencies between systems, processes, and projects. (Lankhorst, 2016)



Figure 15 - Relation between model and metamodel.

As presented in Figure 15, a model is an instance of a metamodel and a metamodel is itself a model that represents another model using a modeling language. A metamodel is a detailed view of another model, “is a model at a different level of abstraction that makes statements about the structure of another model, without making statements about their content.” (Transentis Consulting, 1997-2017)

3.1 Modelling Languages

Modeling is the designing of systems before implementation. Is an essential part of designing a system, it is assured that “functionality is complete and correct, end-user needs are met, and system design supports requirements for scalability, robustness, security, extensibility, and other characteristics, before implementation.” In short, modeling is imperative “to visualize the design and check it against requirements.” (Object Management Group®, Inc., 2005)

The enterprise applications of organizations more than lines of code “must be structured in a way that enables scalability, security, and robust execution under stressful conditions” (2005). The enterprise applications structure (or architecture) must be defined enough to anyone from the makers to the fixers can access and fix the code of the application rapidly.

3.1.1 UML

UML stands for Unified Modeling Language, is a modeling language known, simple, clear and concise, and has been recognized as a standard for modeling software development by the Object Management Group (OMG) in 1997. This notation has evolved from the work of Grady Booch, James Rumbaugh, Ivar Jacobson in 1995.

UML is a method of envisioning a software program using a group of diagrams. To making a UML diagram starts by connecting shapes that represent an object or class with other of the same shapes to illustrate relationships and the flow of information and data. The current UML standards have 13 different types of diagrams: activity, interaction overview, state, use case,

composite structure, class, deployment, component, package, object, profile, communication, sequence, and timing. (SmartDraw, LLC, 1994-2017)

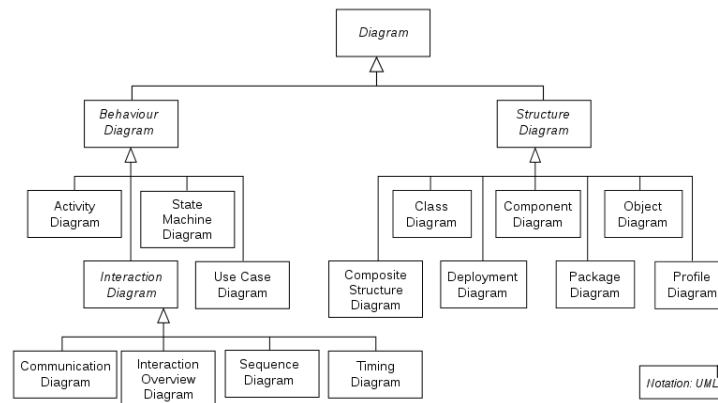


Figure 16 - UML diagrams types. (Dias & Borges, 2015-2016)

These diagrams are systematized into two distinct groups (see Figure 16): Structural Diagrams which encompasses Class Diagram, Package Diagram, Object Diagram and Component Diagram; and Behavioral or Interaction Diagrams that includes: Deployment Diagram, Composite Structure Diagram, Activity Diagram, Sequence Diagram, Use Case Diagram, State Diagram, Communication Diagram, Interaction Overview Diagram and Timing Diagram. (SmartDraw, LLC, 1994-2017)

UML can be used for business modeling or modeling of other non-software systems that capture the language used and the precise requirements. Moreover, it serves as the basis for discussions among users (what questions will be asked), analysts (essential functions) and designers (logical design). (Dias & Borges, 2015-2016) (Object Management Group®, Inc., 2005)

3.1.2 ArchiMate

The representation of the notation used in the metamodel created in this dissertation is in ArchiMate. ArchiMate was a 30 months' project started and managed by Telematica Institute, which is an international consortium of companies and several knowledge organizations. The project took 35 man-years and its cost about 4 million euros. It was jointly funded by the Dutch government and other business partners. (Snair007, 2008)

With a “focus on the relationship between business and IT architectures, the project managed to come up with a comprehensive language for describing architecture models with precision to enable IT architecture designing solutions to standardize their techniques and offerings for effective visualization and analysis (...) it is as much important to know what ArchiMate is not as to understand what it is. ArchiMate is not software development meta language like UML, and it does not support representations in that level granularity. It is also not, like Zachman or TOGAF, an all-encompassing collection of architecture methods that can serve as a framework for the enterprise architecture to function within – its role is limited in enabling the visualization and analytical problem(s) associated with standard architecture frameworks”. (Snair007, 2008)

ArchiMate is a visual language to represent end-to-end enterprise architecture regarding “business processes, applications and infrastructure (technology). It provides a consistent framework for designing multiple architecture domains and relationships among them. An integrated representation approach, ArchiMate equips the IT architects with a powerful modeling standard for representing, communicating and analyzing enterprise architecture. Like any effective modeling language should ideally be doing, ArchiMate helps evaluate the impact

of changes within multiple architecture domains and to communicate them effectively and with ease”. (Snair007, 2008)

ArchiMate is an open and independent modeling language that enables enterprise architectures to describe, Analyze and visualize the relationships among architecture domains in an unambiguous way. ArchiMate is used to translate Enterprise Architecture (EA) models. It provides a framework to organize the concepts utilized in the EA, using a graphical notation that relates the EA with the business strategy to a better consistency and understanding of the models created by the different types of stakeholders involved in the project. (The Open Group, 2016) (The Open Group, 2012-2016)

ArchiMate provides (i) a language with concepts to describe architectures; (ii) an own framework to organize this idea; (iii) a graphical notation for this concept; (iv) a vision on visualizations from the different stakeholders; and (v) an open standard maintained by The Open Group. ArchiMate integrates many concepts of other areas, such business, information system, governance, risk and strategy in one language. It is a way to have clear communication, unambiguity, with coherence and consistency, allows a visualization and analysis. (Lankhorst, 2016)

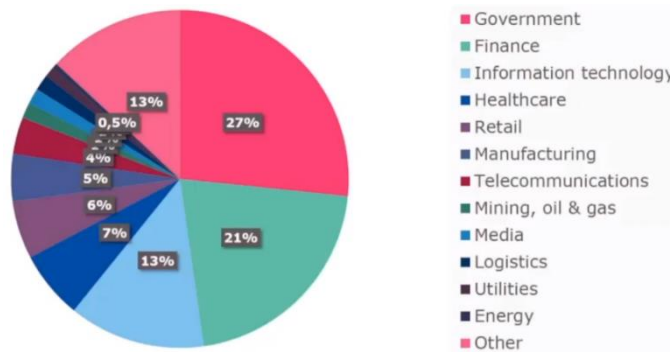


Figure 17 - ArchiMate Industry Usage. (Lankhorst, 2016)

As can be seen in Figure 17, about 80% of usage of ArchiMate are made for six main areas, from the biggest to the smallest, Government, Finance, Information Technology, Healthcare, Retail and Manufacturing; followed by other sectors like, Telecommunications, Mining, oil & gas, Media, Logistics, Utilities, Energy and Others.

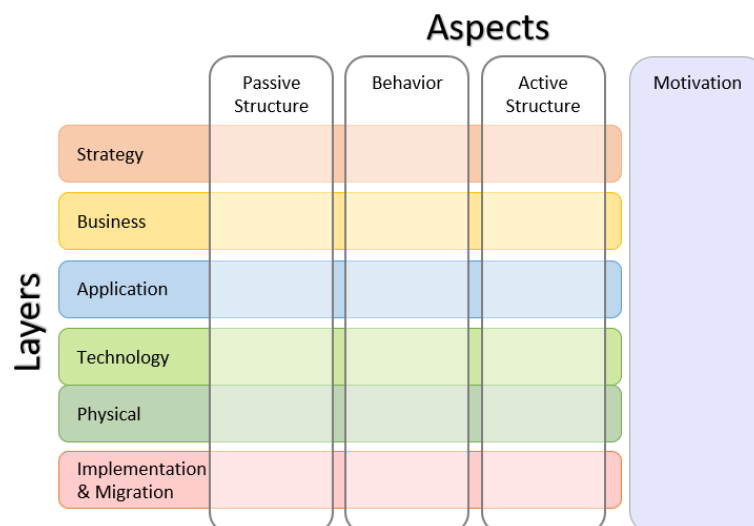


Figure 18 - ArchiMate framework – version 3.

ArchiMate was created in 2009 (ArchiMate® 1.0 standard) with three aspects: Passive and Active Structure and Behavior, that are transversal to all layers inspired by natural language, (subject (active structure), verb (behavior), and object (passive structure)). And three layers, the Business, the Application and the Technology Layers. Then launch the second version (ArchiMate® 2.0 standard) in 2012 in which add the Motivation aspect and the Implementation & Migration layer. (Lankhorst, 2016)

In 2013 was released the ArchiMate® 2.1 standard, and in 2016 release the version 3 where they add more two layers the strategy and the physical layer. The ArchiMate total framework is represented in Figure 18. (The Open Group, 2012-2016) (The Open Group, 2016)

Figure 19 presents a generic metamodel of the organization of the ArchiMate modeling language important to explain the full structure of the language. Where a model it is composed by a group of Concepts, that can integrate three categories, can be Elements, Relationships or Relationships Connectors. Also exist four elements types, the Behavior, the Structure, the Motivation and the Composite. (Lankhorst, 2016)

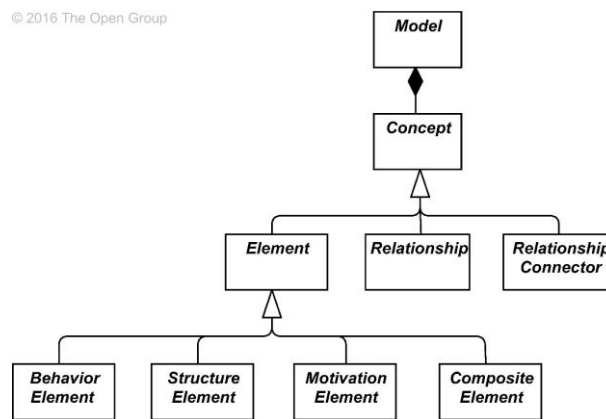


Figure 19 - Top-Level Hierarchy of ArchiMate Concepts. (Lankhorst, 2016)

The elements of ArchiMate are divided into a color and codes by layer or aspect, presented in Table 1.

Table 1 - Layer or Aspect Color and Code.

Layer or Aspect	Color	Code
Business	Yellow	B
Application	Blue	A
Technology	Light Green	T
Physical	Dark Green	P
Strategy	Light Orange	S
Implementation & Migration	Red	I
Motivation	Lilac	M

The general notation used in ArchiMate 3.0 is shown in Figure 20, as example, a Business Actor can be represented as a icon of a men or a yellow box with the same icon in the right top corner. The color represent the layers or aspect (in this case layer Business) and the icon and shape of the box represent the element type, in this case Actor. To the models be able to be read in a

gray, the layer or aspect to which they belong is indicated with the initial of the name in the upper left corner proposed by Marc Lankhorst (2016). The completed elements list is detailed in APPENDIX D.



Figure 20 – Different ways to represent the same ArchiMate Element.

To understand how the elements are integrated into the aspects can be seen in Figure 21 where the Active Structure (subject), represented by the Business Actor element, performs a Behavior (verb), represented by the Business Process Element, using a Passive Structure (object), represented by a Business Object element. To figure what is what, we can use some trigger words, or questions, to identify the Active Structure we should ask for “Who?”, to the Behavior, we should ask for “How?” and for the Passive Structure we should ask for “What?”.

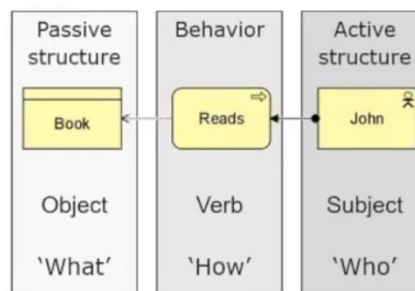


Figure 21 - Core Framework Aspects. (Lankhorst, 2016)

The overview of the core elements divided by the three aspects (Active Structure, Behavior, and Passive Structure), their definitions, and their default graphical notation is presented in Table 9 in APPENDIX D. Most of these elements are abstract; Only their descendants in the different layers of the ArchiMate language are used in the models. (The Open Group, 2012-2016)

The strategy elements were introduced to support the use of EA in the strategy execution through the addition of concepts for modeling strategy, capability-based planning, and related domains. (Lankhorst, 2016)

4 Thesis Proposal

To design and develop the artifact, first, it was necessary understand the connection between MC and BSC and the concepts used in those frameworks. Then study the ArchiMate modeling language, and finally match the strategy concepts with ArchiMate elements. So, to achieve the objectives, it was developed a diagram where was mapped the MC and BSC link, and two metamodels, of a specific part of the previous diagram. In Figure 22 is represented the relationship between the MC by Kaplan & Norton, the MC and BSC mapping and the metamodels created.

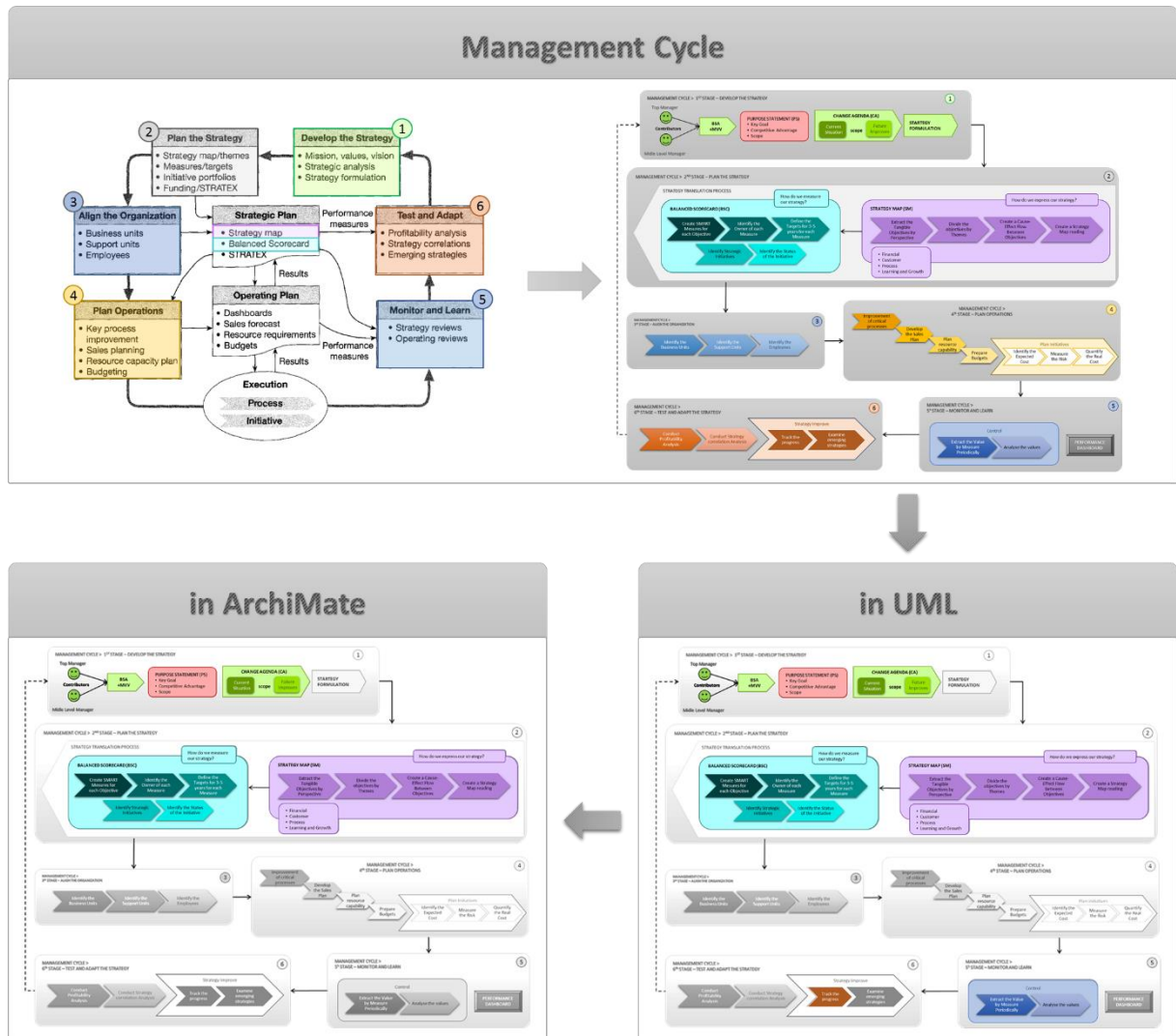


Figure 22 – Metamodels Relation.

4.1 MC and BSC Mapping

This diagram was created to understand the path to the integration of BSC in MC and is presented in Figure 23. In this diagram, it was represented all the six stages of MC, the attributes and the tools used in each stage and it is more detailed the two firsts stages where is integrated the BSC, the core of this study. The link between the Kaplan & Norton MC and the created diagram can be evidenced in Figure 22 by the colors and the numbers in the circles are related to the numbers of the stages.

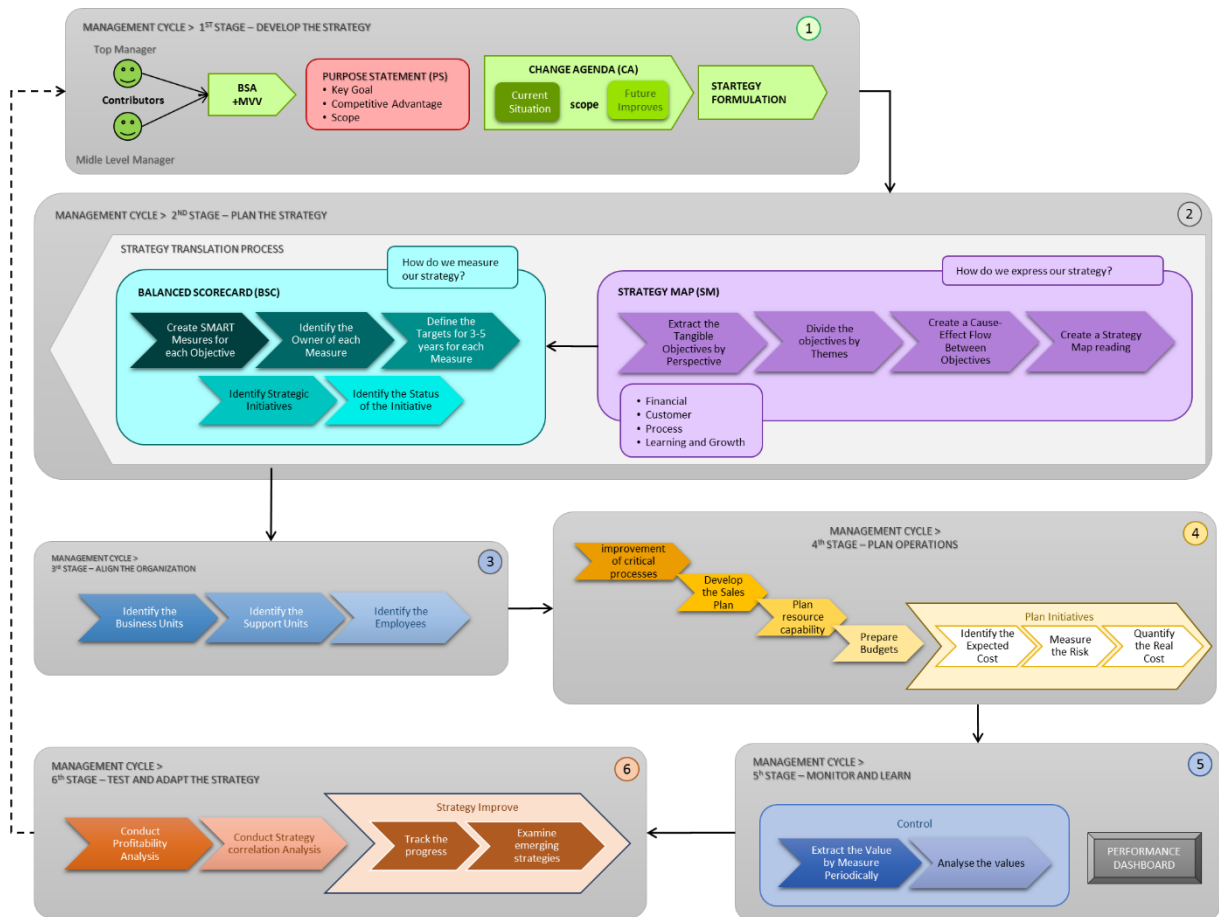


Figure 23 - MC and BSC mapping diagram.

So, this diagram starts with stage one, **Develop the Strategy**, where with two contributors, the Top Manager, and the Middle-Level Managers or Directors contribute to creating the MVV (Mission, Vision, and Values). Next, it is required achieve the Purpose Statement, and this means to identify the core purpose of the organization that describes how a company will be different from its competitors, composed by:

- **Objective:** What's the goal? – The Key Goal represents the reason to be or remain in the business, that “should be something numerical” (2016), like doubling the revenue by year;
- **Advantage:** What can do differently than the competition? – Competitive Advantages are the actions done differently than the competitors (example: “be the best in delivering”);
- **PS Scope:** What won't they do?

(ClearPoint Strategy, 2016)

A Business Strategic Analysis (BSA) should be conducted to achieve the Purpose Statement (PS). After reached the PS should be shared with the entire team to get inputs and make it better. Many companies have significant purpose statements, but with turbulent markets, they need to change and adapt the strategy to market opportunities regularly.

The next step is the Change Agenda (CA) that help identify how an organization will evolve to succeed, that is what needs to change to carry out the PS. Where is supposed to determine the major problems and areas of change, such: Finances (sources of revenue), Ideal Customers,

Key Operations (what a company are good at or need to be good at), Employee Skills, Partnership, and other; and identify future improvements. (ClearPoint Strategy, 2016)

A change agenda is a simple list where three main points should be considered:

- **Scope:** such as Finances (sources of revenue), Ideal Customers, Key Operations (what are we good at or need to be good at), Employee Skills or Partnerships;
- **Present:** What is an organization currently doing that needs change;
- **Future:** What would a company rather be doing in the future to be successful.

First, it should be focused in which part of the organization is intended to change – Scope. Then it is necessary to show the current situations that deserve some attention to improve the performance of the organization, that should be a sentence simple and direct. Finally, some solutions must be defined. The last step of this stage is the strategy formulation that was not detailed (see page 9).

The next stage, **Plan the Strategy**, starts with the Strategy Map (SM) that shows how an organization express their strategy and represents how the organization creates value. In SM are identified the Strategic Objectives (SOs) (that should be tangible) divided by Perspectives and Themes, and how are they related, creating a cause-effect flow that produces a story of the organization strategy. A strategy map shows the path to success and is made up of four perspectives already presented in subsection 2.2.1.

Most of organizations fail to execute strategy because managers never ask themselves who and how are they going to serve. The Balanced Scorecard is the framework that links an organization purpose statement to the execution of its strategy. It helps companies become part of the 10% that executes strategy instead of just talking about it. When applying a strategic map, a company need to monitor it continuously, to do that they can use Measures, which help understand if they are executing the strategy.

Measurements should be SMART: **S**pecific - it clearly and precisely states what will be measured; **M**easurable - it is numerical and can be graphed; **A**ctionable - results can be easily interpreted, and you know what actions to take to affect the measure; **R**epeatable - can consistently gather information over time; and **T**imely - can be measured at an appropriate frequency;

By defining measures and targets for each objective, the strategy implementation can be controlled. To achieve the targets, actions must be taken. Actions or Initiatives tell how to accomplish the goals.

The third stage, **Align The Organization**, have the Implement phase, where the business units, the support units, and the employees are identified.

In the fourth stage, **Plan Operations** has represented the processes that is necessary run, the improvement of critical processes, the develop of sales plan, the resource capability plan, the preparation of budgets and the initiative's planning. The last process includes the identification of expected costs, the measurement of risk and the real cost quantification.

The fifth stage, **Monitor and Learn**, have the control phase with two processes, the extraction of the values by periodically measurement and saved a historic, and second process the analysis of those values. Then should be compared with the Targets to understand if the objectives were being achieved or not. In this stage, can be created a Performance Dashboard to help stakeholders controlling better the goal achieving.

The last stage, **Test and Adapt**, is to understand if the company accomplish the objectives and when. Starts with a profitability analysis, a strategy correlation analysis, and a strategy improve that is achieved by tracking the progress and by examining emerging strategies.

As the MC name tells after the sixth stage should start again by the first one, to help improve the performance of the company.

4.2 UML Class Diagram

As it showed at the beginning of this chapter (see Figure 22) it was modeled a UML class diagram (see Figure 24) focused in the most important part of the MC (for this study). To better understand the cycle of improving the strategy, was modeled the beginning composed of the first stage, omitting the strategy formulation, and for the second stage, focused in SM and BSC; that represent the core of the problem. Moreover, was modeled the end, namely the control part of the fifth and a tiny part of the sixth stage; where is exposed some classes to show how the strategy can be improved. Was also omitted the third and fourth stages, that was considered less important for this study.

This metamodel was created thinking about a possible system that a company could create if it had a team responsible only for the development, implementation, and improvement of the strategy and wanted to maintain a register of all data related to this cycle. It was used this modeling language because it was already known. This model is composed of a set of classes, such as *Perspective*, with a set of attributes that allow a complete characterization of each class. Those classes are connected with different types of associations and were grouped by stage.

Assuming that the system must store information from more than one company (imagine a business group), each *Company* is characterized by the code and name. Each of it has many workers, and the *Worker* name and role should be registered, and he contributes to the stage 1 (to gather the *CurrentSituation* and to determine the *PurposeStatement*) and to stage 2.

Stage 1 it is composed of two parts. The first part is the *AnalysisDate* class where is registered the date and some notes of the BSA that was made and from which it was extracted the *PS*, characterized by the Key Goal, Competitive Advantage and Scope and it should register the complete sentence. It can have different BSAs with the same *PS*.

Moreover, the second part is the group of Change Agenda, that is composed by the *CurrentSituation*, the *Scope*, and the *FutureAction*. Each *FutureAction* has a *StrategicObjective* (SO) associated. Each *PS* can have many current situations. However, a *CurrentSituation* just has associated one *PS*, a *CurrentSituation* can give origin to many future actions, although a *FutureAction* comes from a particular situation. Each *CurrentSituation* has associated a *Scope*, although a *Scope* can have many situations.

In the second stage, two groups are shown, the Strategy Map (SM) and the Balanced Scorecard (BSC). In the first group have four classes: *StrategicObjective* (SO), *Perspective*, *Theme*, *StrategicStory*. The *SO* is characterized by the verb, adjective, and name that compose it and by the *SO*, as a whole. A *SO* is extracted from *FutureAction* and is integrated into one *Perspective* and can be part of many themes. For each *Perspective*, should register the name and the color-code. In each SM a *Perspective* and *Theme* are composed of several *SOs*. However, each *SO* has one *Perspective* and can have many themes.

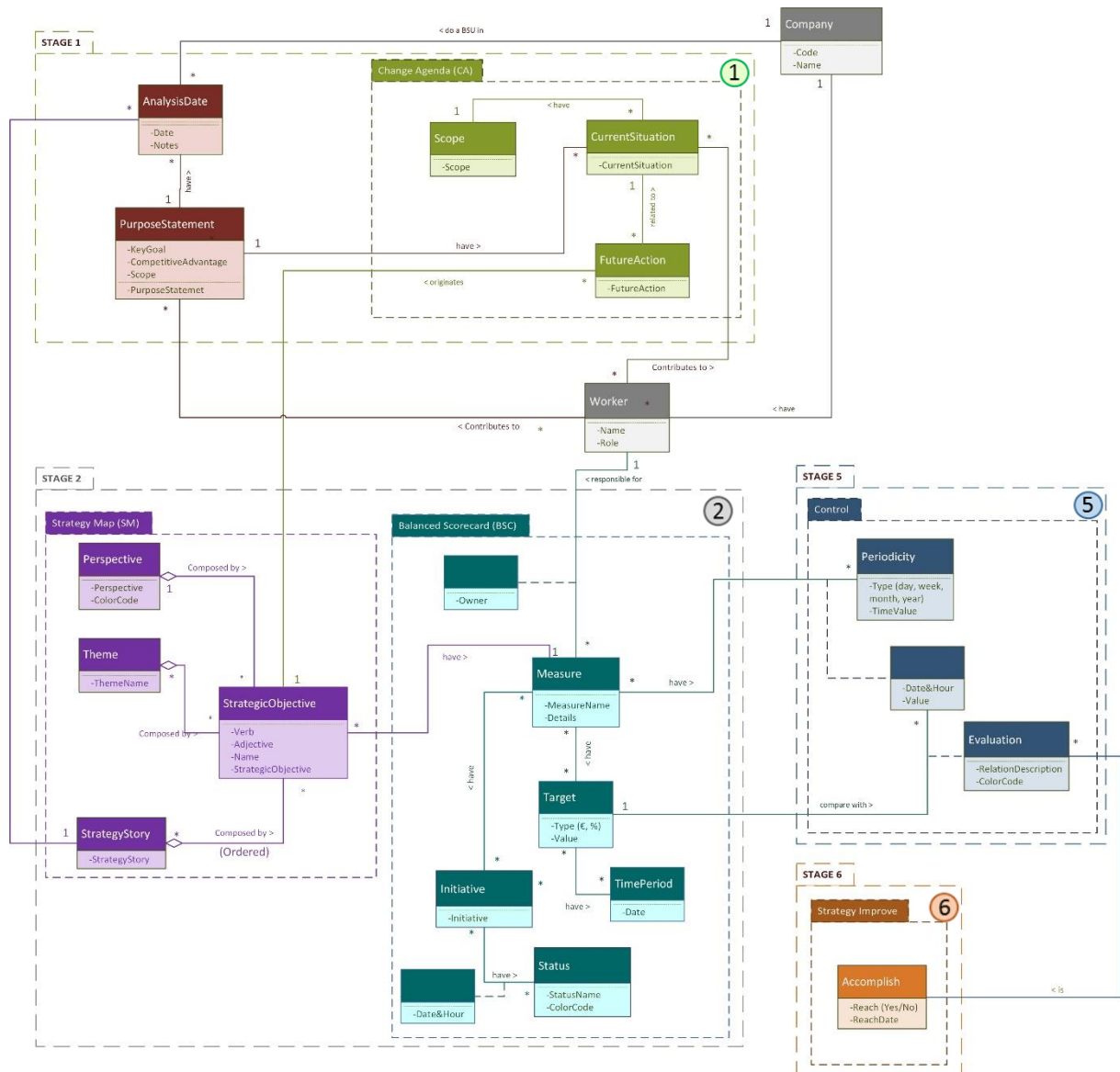


Figure 24 - UML class diagram.

A *StrategyStory* is composed by a group of *SO* in a given order, creating the cause-effect flow. Each *StrategyStory* is compiled on a given *AnalysisDate*. The same *StrategyStory* can be part of different *AnalysisDate* because it depends on the pretended *SOs*.

The second group (BSC) have five classes (*Measure*, *Action*, *Target*, *TimePeriod*, *Initiative*, and *Status*) and other two relation classes. Each *SO* has one *Measure*, although a *Measure* can be linked to many *SOs*. A *Measure* is characterized by name and details of how to calculate that measure. Each *Measure* has one of the workers as an owner. Moreover, a given *Worker* can be responsible for many measures. Each *Measure* has associated a *Target* and an *Initiative*, but those parameters can be different from company to company.

The *Target* is characterized by the type that can be in euros or percentage, and by value. The *Target* also has a *TimePeriod* associated, that means a given *Target* should be reached in a particular year or some months. An *Initiative* have a *Status* associated, name and color-code characterize that. Is important to know when the status has changed. The color-code for the status can follow the next parameters:

- Red – not yet implement;

- Yellow – in implementation;
- Green – already fully implemented;

After gathering the data to *StrategicObjective*, the *Measure*, the *Target*, and the *Initiative* it is necessary to control (stage 5), i.e., collect data periodically indicating the date, hour and value of the measure. The *Periodicity* is characterized by time value and the type that can be days, weeks, months or years. After collecting a value of a given measurement, this should be evaluated. In the *Evaluation*, should register, a description of the relationship with the *Target*, and a color-code for the status of the value:

- Light Red – Very far from the *Target*;
- Light Yellow – Close to the *Target*;
- Light Green – Reach the *Target*;

The last stage appears to complete the system where the answer to the last question should be recorded: If *Target* was hit and when.

4.3 Metamodel in ArchiMate

It was created a proposed metamodel in ArchiMate and to represent it was focused on two layers and one aspect of ArchiMate 3.0, the Business and the Strategy layers and the Motivation aspect. As shown in Figure 22, was just modeled the SM and the BSC (parts of the second stage) and the most of the first stage (just omitting the Strategy Formulation). This metamodel focuses more in the second stage of MC, as presented in Figure 25. It was not detailed the part of the process of *Run Strategy Analysis* (BSA) because it was not the focus.

Answering to one of the objectives, in Table 2 are shown the proposed correspondence between the strategic concepts used in the metamodel and the elements of ArchiMate 3.0, and in bold are represented the most important concepts.

This architecture (see Figure 25) starts by identifying the actors involved in two major processes, the *Company Worker* assigned to two Business Role elements: *Top Manager* and *Middle-Level Manager*. They are both assign to a Business Collaboration element where they *Contribute* to two Business Process elements, both linked by a realize connector, one is *Analyze the Strategy*, and the other is *Improve Performance*.

Following the first process, although it was not detailed are represented four important concepts: *Resource*, *Capability*, *Competitive Advantage* and *Purpose Statement*. The last concept will be an input for the discovering of the Strategic Objectives. So, *Analyze the Strategy* realizes *Capability* and this, in turn, have a *Resources* assigned. Then, the *Capability* is associated with *Competitive Advantage*, and this influences the *Purpose Statement*.

The next Business Process element is the *Improve Performance*, that is composed by three sub-processes:

- *Run Change Agenda* – this process is associated with *Need to Change*, that is associated with the *Problem Identification*, that in is turn is associated with the *Future Improvement*.

Those two last elements are related to the Scope, and the first sub-process flows to the second sub-process.

Table 2 - Concepts used in the metamodel vs. elements of ArchiMate 3.0

Concepts (Business, Strategy, CA, SM, BSC)	ArchiMate	
	Layers or Aspect	Element
Person	Business	Actor
Person Role	Business	Role
Analyze the Strategy	Business	Process
Capability	Strategy	Capability
Resource	Strategy	Resource
Competitive Advantage (Part)	Strategy	Capability
Purpose Statement (Part)	Motivational	Goal
Improve Performance	Business	Process
Run Change Agenda	Business	Process
Need to Change	Motivational	Driver
Problem Identification	Motivational	Assessment
Future Improvement	Motivational	Outcome
Scope	Business	Object
Run Strategy Map	Business	Process
Strategic Objective	Motivational	Goal
Cause-Effect Linkage	Motivational	Meaning
Perspective	Business	Object
Run Balanced Scorecard	Business	Process
Measure	Motivational	Metric
Frequency of measurement	Motivational	Assessment
Date	Business	Object
Measure Owner	Motivational	Stakeholder
Measurement Value	Motivational	Value
Target	Motivational	Outcome
Initiative	Strategy	Course of Action (high level)

- *Run Strategy Map* –is related to the *Strategic Objective* and the *Cause-Effect Linkage*. Those two elements are associated with the *Perspective*.

The *Future Improvement* realizes the *Strategic Objective*, this is, the SO defined through the *Future Improvements*; and the second sub-process flows to the third sub-process

- *Run Balanced Scorecard* – is associated with *Measure*, and this is related to *Frequency of measurement*, with *Target* and with *Measure Owner*.

The *Frequency of measurement* and *Target* have an association relationship between them. At last, the *Target* and the *Measure Owner* are associated with the *Measurement Value*, and from the first association (*Target-Value*) has another association with *Initiative*.

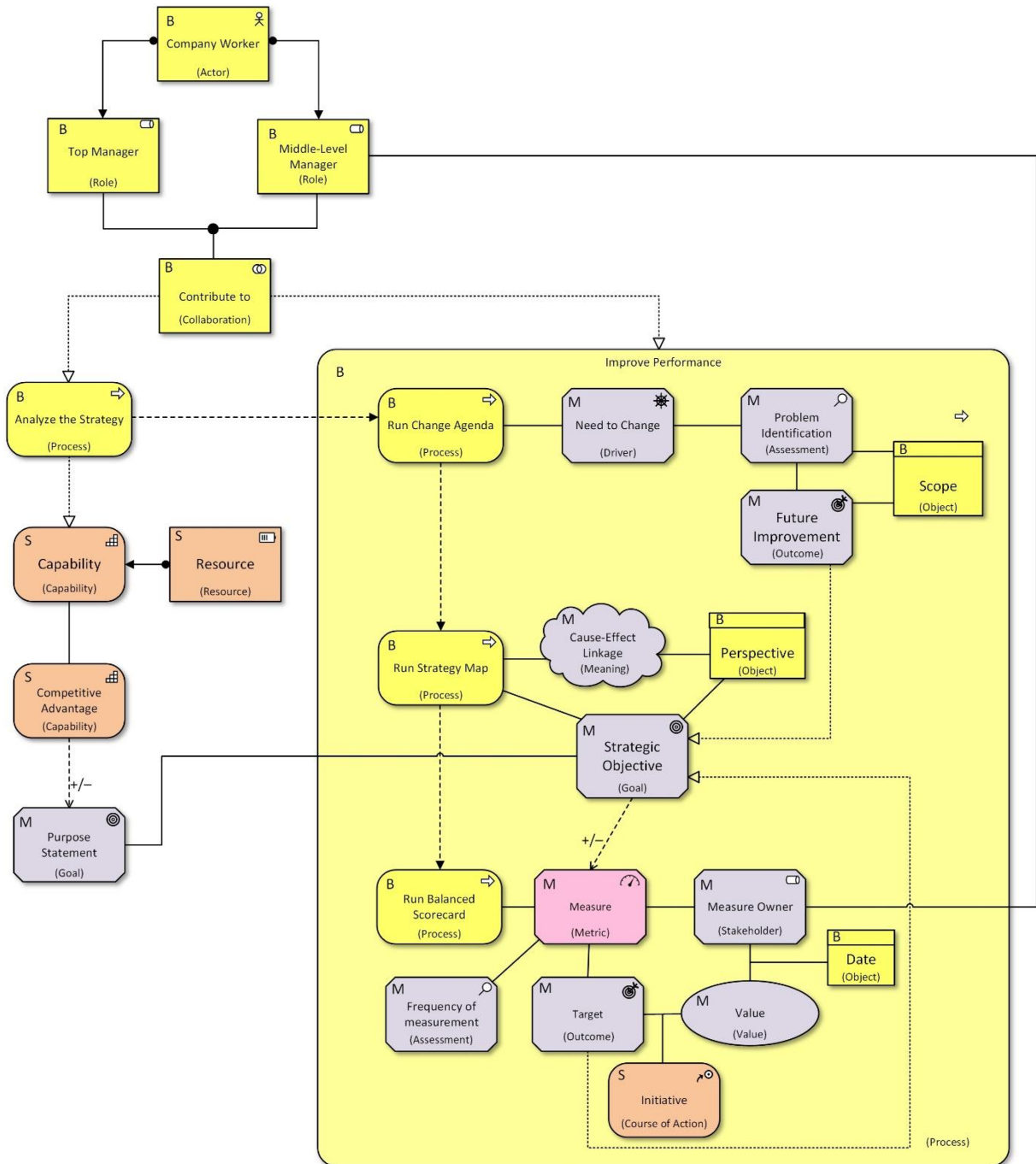


Figure 25 - Metamodel in ArchiMate 3.0, modelled in Visio.

From the first association (*Measure Owner-Value*) has another association with *Date* of measurement, represented as a Business Object element. Measure Owner has other association with the *Middle-Level Manager*. At last, the *Target* realizes the *SO*, this means, when the *T* is reached, perform the *SO*.

5 Demonstration

This chapter is divided into three sections; the first presents the health industry in general, the second, it is focused on the specific organization that was chosen, namely Luz Saúde. In the last section is presented the demonstration of the artifact, this is, the application of the metamodel developed.

The data considered in this case is based on public information and not in organization internal or confidential information. However, the collected data is enough to demonstrate that the proposed metamodel can be applied to the organization. This demonstration focuses on one of the business units of Luz Saúde (LS), private health care, namely the hospitals. This organization is one of the largest groups of health care providers regarding income in the Portuguese market.

5.1 The Health Industry

“Health in Portugal has evolved a lot in the last 40 years and has approached the most developed health models in Europe and the world,” Says Vasco Antunes Pereira, director of the Hospital of Cascais. There is now a set of private and public systems that cover the generality of the needs of the market. Although there is still a great way to go in primary care. (Lusíadas, 2014)

In 2014, the 35th anniversary of the National Health Service (SNS in Portuguese) was celebrated, which by law established a network of institutions and services providing comprehensive healthcare to the entire population, financed through taxes, in which the State safeguards the right to health protection. The organization of the SNS has been influenced by political, economic, social and religious concepts related to each era and was materialized to respond to the health problems then identified, but also with the aim of promoting the health of the people. Before the creation of this system, in the nineteenth and twentieth centuries, medical care was the responsibility of families, private institutions, and social-welfare services. (Serviço Nacional de Saúde, 2016)

SNS still has some difficulty in the entering of the private sector in its program. Although, there are already cases of recognized success of private individuals to manage public units, such as public-private partnerships (PPPs), “with a view to promoting innovative ways of sharing risk for health care, such as new management experiences, as well as the participation of the private sector in the design, construction, financing and operation of hospital units of the National Health Service (SNS)” (2016). (Lusíadas, 2014)

The mission of public hospitals is differentiated health care, in articulation with the other integrated into SNS healthcare. The hospitals are considered services of public interest, instituted, organized and administered with the aim of providing the population with curative and rehabilitative medical care, and they are also responsible for collaborating in disease prevention, teaching, and scientific research. In the last years, the health care industry has experienced several transformations regarding management and delivery, in search of greater efficiency and quality. (Serviço Nacional de Saúde, 2016)

The demographic evolution in Portugal has been experiencing a drastic reduction in the birth rate, an increase in the average life expectancy, an increase in the prevalence of chronic diseases and the problem of illness at the end of life. (Serviço Nacional de Saúde, 2016)

Between 2002 and 2013 the total number of hospitals in the country increased from 213 to 226. Growth at the expense of the private sector, which in the same period gained ground where the SNS lost. In the same period, private hospitals increased from 94 to 107. In ten years, they grew

in the number of beds, in emergency rooms, in a diagnostic test and number of units. In public are 113, to which are added six more prison or military hospitals, but that is not if universal access. This growth in the number of private hospitals was due to the commitment to channel ADSE funds to the private sector, to the lower moderating fees and to the reduction of prices, which in some private the moderating fees are lower than in the public sector. When a person truly has a health problem and the consultations take more time, and the waiting lists are larger, he/she look for alternatives that are now available in private. (Maia, 2015)

5.2 Luz Saúde

Since the year of its foundation (2000), LS is an integrated network that includes hospital units, outpatient clinics and senior residences. In 2014 after the shareholder change, the organization changes the name to Luz Saúde, and in 2015 they continued with the change of the brand during in the Group's units. The Group assumed the Hospital da Luz as a reference brand and network drive to provide health care, with the three brands presented in Figure 26.



Figure 26 - Luz Saúde Brands. (Luz Saúde, S.A., 2017)

As presented in Figure 27, this corporation develops a diversified business model organized into four main operational segments:

- The **Private Healthcare Segment**, which includes the main hospital care units (twelve) and the outpatient clinic network Group (eight), (see Figure 27 first column).
- The **Public Health Care Segment**, which corresponds to the management of a public hospital under the Public-Private Partnership Contract (PPP), (see Figure 27 second column).
- The **Other Activities**, including the two senior residences that were designed to offer a solution to independent senior citizens or who need assistance in the performance of their day-to-day activities, (see Figure 27 third column).
- The **Corporate Center**, focuses on the provision of centralized services to the various Group units.

The structure of the all company (Group 's holding combined with Luz Saúde - Services, ACE) “includes the Central Directions, which provide support to the Board of Directors, as well as services to the various operating units of the Group, thus achieving economies of scale, Knowledge and talent and ensuring homogeneity in the strategy and standards of the various units”. (Luz Saúde, 2015)

Hospital da Luz, completed 10 years in April 2017, and when in the beginning, Ricardo Salgado, then manager of the Grupo Espírito Santo (GES), the main shareholder of this hospital, said he hoped that the group's investment (150 million euros) would return after seven years, nobody expected that at the end of two years, the company already had net profit. Now, the group has an annual turnover of 155 million euros.



Figure 27 - Structure of Luz Saúde and its business units. (Luz Saúde, 2015)

Isabel Vaz, the actual Group administrator, affirmed “The hospital basically tripled all our initial predictions. (...) The private sector is financed by a dual coverage approach, since in addition to paying our taxes in order to have access to the SNS, about 40% of the Portuguese population also pays to access the private healthcare network (20% insurance, Half paid by employers, and private)” (2017). In February 2014, it became the first privately-held company in the public health sector and in October 2014, Portuguese insurance company Fidelidade acquired 96% of the company's shares, becoming the new majority shareholder of LS. (Lusa, 2017)

This organization has a commitment to social responsibility that focuses on the transparency of its activity and the reconciliation between care delivery and the involvement, motivation, and satisfaction of all stakeholders. To fulfill this commitment, the institution promotes initiatives with the concern of contributing to the training of its employees and of being inserted and contribute to a healthier and more solidary society. In addition it collaborates with organizations with which it shares objectives and strategies, in a commitment to solidarity, mutual aid, support to the needy, support for caregivers, promotion of the dignity and autonomy of the dependent people and their families. (Luz Saúde, S.A., 2017)

LS evaluates and selects suppliers and products based on objective and rigorous standards to guarantee the delivery of high-quality services and satisfaction. The negotiation is carried out by the Luz Saúde Trading Center in order to rationalize and standardize quality and cost in all units. Thus, competitions are created for each of the functional areas or medical specialties, which obey objective criteria, aiming at optimizing the quality/price ratio for all acquisitions. This activity is developed for Procurement (acquisitions of equipment, clinical consumables, hotel products, department stores and maintenance) and Pharmaceutical Services (purchase of drugs and similar). With the objective of creating levels of service adjusted to the operational needs and contribute significantly to the excellent operational results. (Luz Saúde, S.A., 2017)

As presented on the website of the organization, the main strategic directions of LS include (Luz Saúde, S.A., 2017)

- The creation of an integrated network of health care that incorporates hospital units, outpatient clinics, and residential hospitals.
- The establishment of partnerships with public purpose within the Public-Private Partnerships Program.
- The development of residences especially geared towards the elderly - senior residences with services.

5.3 Demonstration

It was applied, to implement the BSC, the first two Stages of the Management Cycle, already presented in chapter 2. The first stage – Develop the Strategy – including the definition of the mission, vision, and values. The strategy of this organization it was already developed, but for this demonstration, it was necessary to proceed to a BSA and posteriorly to a CA analysis since the author did not have knowledge of the strategic details to find the Strategic Objectives (SO). The details of the application of those tools are presented in the following two sub-sections.

5.3.1 Luz Saúde Business Strategy Analysis

As already explained in section 2.4, apply the BSC to an organization is only possible after the development of the strategy. Therefore, to be able to apply the BSC by counting that the LS already has a strategy developed and formulated. So, it becomes necessary to study this strategy in more detail, for this, a BSA of the organization under study was carried out to help to understand the current situation.

To assist in this process, it will follow the diagram on Figure 5 presented in chapter 2.1.1, with the goal of obtaining the Competitive Advantage and the Purpose Statement. As already presented, the mission vision and values create the guidelines for the strategy formulation and implementation. So, from the Luz Saúde website it was extracted:

Mission: "Diagnose and treat quickly and effectively, with absolute respect for the patient's individuality, and build an organization capable of attracting, developing and retaining exceptional people."

Vision: "Luz Saúde's vision is to be a reference operator in the delivery of health care, by practicing a medicine of excellence and innovation."

Values:

- Tireless search for results
- intellectual rigor
- Constant learning
- Personal responsibility
- Respect and humility
- Positive attitude
- Integrity
- Team spirit

The next step is the Internal Environment Analysis what is began with the resources gather. As assets that organizations have or can call upon, that are divided in tangible and intangible (see APPENDIX A, A.1.1, and A.1.2). Then was found the Capabilities, that are what an organization does, divide by functional area (see APPENDIX A, A.1.3).

To find the Core Competences, it was essential the use of two tools, the Four Criteria of Sustainability Advantage (VRIN), to found the most valuable resources, and the Value Chain (VC), to understand the cost/price position across the value network (see APPENDIX A, A.1.4, and A.1.4). After that two analysis it was extracted the Core Competence (see APPENDIX A, A.1.6).

The External Strategic Analysis starts with PESTEL, to analyze and monitor the external marketing environment factors (see APPENDIX A, A.2.1) and proceed with the Porter Five Forces, to understanding where power lies in the business situation (see APPENDIX A, A.2.2). In this case, with the high amount of capital needed to enter this market, the large dimension facilities needed, the fact of the existing hospitals have established a brand reputation and the highly differentiated services in one place, the threat of new entrants is very weak.

With the existing of more suppliers than buyers, the fact of existing some substitute products, the cost of switching suppliers be medium and the existence of the Luz Saúde Trading Center that have the function of negotiates with the vendors (Medical Equipment, Consumables, Furniture, Desks, Drugs and Maintenance), the Bargaining power of suppliers is medium to low.

Being that substitute services are available, they buy in huge quantities, that a high number of buyers exist, the switching cost to another supplier is medium, and the buyers are price sensitive, the Bargaining power of buyers is medium. The threat of substitutes services is medium because exist some similar services; the patients can switch to public hospitals (which is very often in the case of cancer patients when they lose the ability to purchase).

Although the service may not be exactly at the same level, that is, the private service is more personalized and has access to other types of resources that may not have in public. There are also other private clinics that provide similar services but not the same size of medical specialties and technologies in one place.

Moreover, the Rivalry among existing competitors is intense because there are many competitors, the exit barriers are high, the industry of growth is slow, the products are not differentiated and can be substituted, the competitors are of equal size and the customer loyalty is medium high. In sum, this is an attractive industry with a high-profit potential.

Then it was achieved the Critical Success Factors (CSFs) (see APPENDIX A, A.2.3) that represent the essential elements for achieving success. The identification and the communication of the CSF's could help ensure that the business is well focused and can minimize wastage regarding effort and resources in less critical areas.

An analysis of the market segments (see APPENDIX A, A.3) was also made, and the conclusion that was achieved was that just the Hospitals (public and private) could answer to the three market segments. The private clinics are centered in the Specialty Appointment and the Routine Follow-up (checkup). The Private Medical Offices are a focus on Specialty Appointment. Moreover, the Home Physician targets are the Urgency and Specialty Appointment.

After the conclusion of all those analyses, it was possible make a SWOT analysis. Another tool needed to the strategic analysis that presents the factors that have a profound impact on a business's performance and helps achieve the strategic goals (see APPENDIX A, A.4).

The Porter's Generic Strategies is a tool that describes how a company pursues competitive advantage. A sustainable competitive advantage is achieved when a good number of buyers prefer its services over those of rivals and when this preference can be maintained over time.

Conclude that the LS has a Differentiation Strategy (see APPENDIX A, A.5) as long as they preserve the integration of the health sector PPP program. Differentiated because they have Uniqueness, such:

- Are leader in the area of health in Portugal;
- Integrate the PPP program of the health sector;
- Have long-term relationships with all the main paying agencies operating in this sector in Portugal;
- Have modern hospital assets and sophisticated medical technology;
- Have diversified health care in one place;
- Have an experienced management team with a history of growth management based on clinical excellence;
- Have the best services and infrastructures in the sector;
- Have a geographically comprehensive network of health care units;
- Have a qualified, experienced and motivated clinical staff;

If this partnership dissolves, they return to the Focused Differentiation Strategy where they coming back to the Narrow Target because is just for users that benefit from:

- health insurance;
- supplementary health insurance;
- work accident insurance;
- road or personal accidents;
- life insurance;
- agreements with undertakings, associations and other entities, with agreements or conventions, settled down;

After the strategic analysis of LS it could be extracted the current¹ Purpose Statement (see APPENDIX A, A.6):

- LS will maintain the focus on profitable growth achieving the best health outcomes. They will double the size and production by 2019 and will double their turnover by the end of 2024. Through the negotiation of future partnerships with the State, the improve of partner relationships, the investment of millions of euros, the improvement of the speed of access to diagnosis and treatment. Through the adding of new valances and new surgical plans. Through the expansion to new places creating value for its shareholders and other stakeholders with a focus in Portugal.

5.3.2 Luz Saúde Change Agenda

As already presented in section 2.4, to implement the BSC data must be collected, such problems and future changes extracted through the Change Agenda (CA), showed in Table 3, where it was named some situations that need to be changed, divided by the scope and then proposed some improves.

¹ Current because the strategy is always evolving and changing, to adapt to the market and unexpected situations, the organization must change direction many times.

Table 3 – Luz Saúde Change Agenda.

Scope	Present	Future
Customer	There are problems with the relations with cancer patients.	Improve the transparency relationship with cancer patients
Customer	It only reaches a part of the population (education and financial problems)	Create Health education campaigns and partnerships with health associations and insurance.
Business	Low customer retention level	Improve customer relationship management to retain more costumers.
Financial	High-level costs	Reduce Fixed Costs by implementing lean practices
Service	Some special services not available	Invest in new technologies to be the leader in special treatments
Process	Inefficiency in some processes	Automate processes
Locations	Not enough space.	Expand facilities
Culture	Low Awareness as Industry Leader	Be recognized as Industry Leader
Culture	Part of the 20 best companies to work in Portugal.	Improve the three most valued factors in the election of the 20 best companies to work in Portugal (long-term job security, work-life balance, and a pleasant work environment)
Service	Don't do transport for the urgency patients.	Do partnerships with Emergency Medical Services, such as INEM, firefighters and other health units.
Employees	Retirement age more advanced, few young professionals	Create more and better health practitioners (education and training programs and job programs)
Research	Not enough research and specialty planning	Develop research conferences to plan the future of health industry
Research	Poor interinstitutional collaboration	Develop research conferences to plan the future of health industry

(Jornal i, 2014) (Lusa, 2017) (Botelho, 2017) (Arreigoso, 2017) (Pimentel, 2017)

There may be many other problems that need to be solved, but for this work, we just select some of them which seemed more current.

5.3.3 Luz Saúde Strategy Map

Following the process described in section 2.4, the next move is the definition of the Strategic Objectives (SO) and the construction of the cause-effect flow, using for that the Strategy Map (SM), that will originate the strategy story of the organization. The SOs were found through the BSA and the CA analysis and are presented in Table 4 with its code, that helps to be referred and their associated Perspective.

Table 4 – LS Strategic Objectives (SO) by Perspective.

Strategic Objective (SO)	SO_Code	Perspective
Increase Customer Number	SO_1	Internal Process
Double Turnover	SO_2	Financial
Improve Productivity	SO_3	Internal Process
Double Production	SO_4	Internal Process
Double the Size	SO_5	Internal Process
Target a more broader market	SO_6	Internal Process
Optimize Technology	SO_7	Learn & Growth
Decrease of the Seasonal Overcrowding	SO_8	Internal Process
Improve Knowledge Sharing	SO_9	Internal Process
Increase the Efficiency of the Service	SO_10	Internal Process
Increase the Number of Medical Specialties in each facility	SO_11	Internal Process
Improve Thought Leadership	SO_12	Learn & Growth
Lead by innovation	SO_13	Learn & Growth
Reduce Costs	SO_14	Financial
Increase Revenue in Target Markets	SO_15	Financial
Improve the Surgical Specialty	SO_16	Internal Process
Improve the health care network	SO_17	Internal Process
Improve Customized Customer Experience	SO_18	Customer
Increase Awareness as Industry Leader	SO_19	Internal Process
Increase Retention Levels	SO_20	Internal Process
Increase the Effectiveness of the Service	SO_21	Customer
Negotiate Partnerships with Educational Institutions	SO_22	Internal Process
Increase Employees Expertize	SO_23	Learn & Growth
Optimize Human Capital	SO_24	Learn & Growth

After the achieving of the SOs, it is time to move to the proposed SM to LS, that is represented in Figure 28. The SOs are in balloons, the lines are the four SM Perspectives, and the columns are the proposed Themes. The cause-effect flow is represented by the arrows between the SO (balloons). The SM read should be from bottom to top, beginning with Learn & Growth Perspective to the Financial Perspective. In the next paragraphs, it was described the most important part of this flow, so here is the story the strategy map tells:

The company is working to improve culture, encouraging a greater focus on sustainable learn and growth, increasing employee's expertise and consequent engagement. That's necessary to increase human capital and invest in innovation and new services that satisfy emerging

customer needs. The company may need to negotiate partnerships with the best education institutions in the world, to optimize human capital.

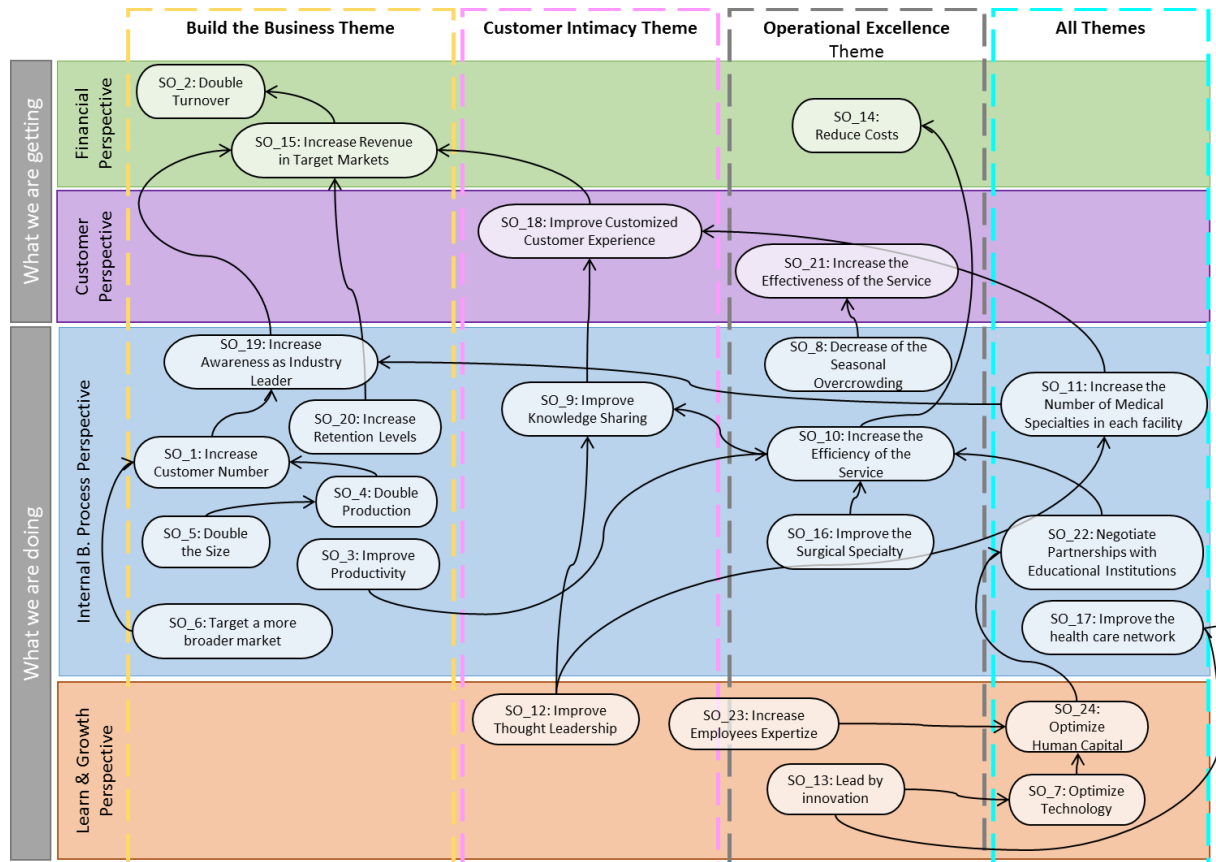


Figure 28 – Luz Saúde Strategy Map.

Taken together, increased innovation and operational efficiency it will enable the company to improve its internal processes. Based on a Learn and Growth strategy, several improvements may occur, like: knowledge share, higher efficiency, more and better medical services, which turns the company more attractive and expandable to new markets.

The way that needs to be paved is based on the following initiatives: From a Customer perspective, increase overall effectiveness, improve customer experience. From a Financial perspective, it should result in higher revenues and reduced of costs.

5.3.4 Luz Saúde Balanced Scorecard

The next step is choosing the Measure (M), settled a value for the Target (T) and then should be created some corrective actions to implement (Initiatives (I)). To better systematize all the information of the implementation of BSC to LS, it was divided into three tables:

- in Table 5 is presented the M and the T by SO;
- in Table 6 shows how it should be calculated and shows the parameters that are necessary to control, to achieve those M;
- in Table 7 is exhibit the proposed action (I) to each M.

Table 5 – LS BSC Data (Strategic Objective – Measure – Target)

SO_Code	Measure	Target
SO_2	Turnover	350 million of euros at the end of 2024
SO_3	Productivity	+20%
SO_1	Customer Number	+10%
SO_4	Production	+100% at the end of 2019
SO_5	Size	+100% at the end of 2019
SO_6	Market Share	+20%
	Partnerships	+10%
SO_7	Technology Level	+20%
SO_8	Service Lead Time	-15%
SO_9	Knowledge Base Effectiveness	+10%
SO_10	Efficiency	-10%
SO_11	Number of Medical Specialties	+5%
SO_12	Thought Leadership	+10%
SO_13	Innovation	+10%
SO_14	Costs	-10%
SO_15	Revenue	+100%
SO_16	Number of Surgical Specialties	+30%
SO_17	Places Number	+30%
SO_18	Customer Experience	-10%
SO_19	Awareness	+30%
SO_20	Customer Retention	+10%
SO_21	Effectiveness	+30%
SO_22	Partnerships Number	+10%
SO_23	Commitment and Skills Level	+10%
SO_24	RH Turnover	-10%

As previously mentioned, Measure (in BSC concepts) can be compared with a KPI that is what is presented in Table 5. The values of the targets, are just indicative, as there wasn't internal information from the organization. Just the data in underlined is real and were founded in the news about LS.

Table 6 – How to Calculate & What control to Achieve the Measures.

Measure	How to Measure (How to Calculate & What Control)
Turnover	Billing volume and total assets
Productivity	Labor hours and production volume
Customer Number	Total customers number
Production	Number of services provided per hospital or geographic area
Size	Number of hospitals in the network of health care
Market Share	Company billing volume/market total billing volume in a period
Partnerships	Partnerships number (public/private)
Technology Level	Number of automated processes / total number of processes
Service Lead Time	Time between entering and exit in days
Knowledge Base Effectiveness	Percentage of problems solved by using knowledge base
Efficiency	Patient wait time calculates the average amount of time a patient must wait between checking in and seeing a provider; Lead-time.
Number of Medical Specialties	Nº of medical specialties by location
Thought Leadership	Nº of quotes and references in each quarter.
Innovation	Nº of new services or service improvements; nº of patents or patent applications; nº of process innovations; return on innovation investment;
Investment Amount	Percentage of investment; savings levels due to improvement efforts;
Costs	Sum of all fixed and variable costs.
Revenue	Amount of money received in exchange its services
Number of Surgical Specialties	Number of surgical specialties by facility
Places Number	Number of beds
Customer Experience	Response time, customer satisfaction survey and overall customer satisfaction
Awareness	Volume of mentions, reach and engagement
Cutomer Retention	Customer retention rate
Effectiveness	Customers satisfaction rate and total customers number
Partnerships Number	Number of educational institutions partnerships
Employee Productivity Rate	Measure workforce efficiency over time. Total company revenue divided by the total number of employees

(ClearPoint Strategy, 2016)

In Table 6 are presented some parameters that should be controlled and can help to calculate the M. Although these parameters have been chosen, there may be others for the same measurements.

Table 7 – LS BSC Data (Strategic Objective – Measure – Initiative)

SO_Code	Measure	Initiative
SO_2	Turnover	Decrease costs, Create partnerships with other industries to create more accessible health insurance systems to increase the number os costumers and services provided.
SO_3	Productivity	Improve labor conditions. Invest in technology.
		Create partnerships with other industries to create more accessible health insurance systems
SO_1	Customer Number	Build partnerships with other industries to create more accessible health insurance systems
SO_4	Production	
SO_5	Size	
SO_6	Market Share	Innovation, strengthening customer relationships, smart hiring practices, and acquiring competitors
	Partnerships	Negotiate Partnerships
SO_7	Technology Level	Investment in Information Technologies, Investment in state-of-the-art clinical, Improve the information systems
SO_8	Service Lead Time	Apply KAIZEN and LEAN tools to reduce lead time. Invest in technology. Create collaborative networks in the health industry.
SO_9	Knowledge Base Effectiveness	Improve the Electronic Health Record, Invest in knowledge management systems
SO_10	Efficiency	Apply KAIZEN and LEAN tools to reduce lead time.
SO_11	Number of Medical Specialties	Increase Facilities, Investment in Infrastructures,
SO_12	Thought Leadership	Apply KAIZEN and LEAN tools in a view to reduce inefficiency and costs.
SO_13	Innovation	Clinical governance of its operational units, Multidisciplinarity, Team Medicine
SO_14	Costs	Improve Processes,
SO_15	Revenue	Improve Marketing Campaigns, Review Pricing Strategies, Expand health Units, Diversify Offerings, Improve Relationships
SO_16	Number of Surgical Specialties	Improve the key personal skills and hire specific professionals for the main surgical intervention, according to the market needs.
SO_17	Places Number	Expand to new strategical locations
SO_18	Customer Experience	Mobile Customer Support, Live Chat Channels, Self-Service Management, Social Media Support, Omnichannel Support
SO_19	Awareness	Host Educational Events, Host Social Events, Organize a Service Project (ex. special volunteer day), Be the Helpful Friend, Distribute Brochures or Inserts and Empower and Connect Others
SO_20	Customer Retention	Manage expectations. Deliver more and accept feedback.
SO_21	Effectiveness	Create a questionnaire system to run at the end of each service
		Decrease costs, Create partnerships with other industries to create more accessible health insurance systems
SO_22	Partnerships Number	Build alliances with the best-rated universities and research institutes
SO_24	RH Turnover	Improve career plans and employment conditions.

For each one of those pretended M, it was proposed some initiatives to help achieve the SO. Those initiatives are presented in Table 7 divided by SO.

5.3.5 Application of the Metamodel to Luz Saúde

The link between the fragments of Competitive Advantage, the fragments of Purpose Statement and Strategic Objectives required to the design of the instance of the metamodel is established in Table 8.

Table 8 - Competitive Advantage, Purpose Statement, and Strategic Objectives relations.

Competitive Advantage	Purpose Statement	SO_Code
Are leader in the health sector in Portugal	Double the turnover by the end of 2024 in Portugal.	SO_2
	Double the size and production by 2019 in Portugal.	SO_3
		SO_1
		SO_4
		SO_5
Integrate the PPP program of the health sector	Negotiate future partnerships with the State	SO_6
Have long-term relationships with all the main paying agencies operating in the health sector in Portugal	Improve partner relationships	
Have modern hospital assets and sophisticated medical technology	Invest million of euros	SO_7
	Improve the speed of access to diagnosis and treatment	SO_8
		SO_9
		SO_10
Have diversified health care in one place	add new valances	SO_11
Have an experienced management team with a history of growth management based on clinical excellence;	Achieving the best health outcomes	SO_12
		SO_13
	Maintain focus on profitable growth	SO_14
		SO_15
Have the best services and infrastructures in the sector	add new surgical plans	SO_16
Have a geographically comprehensive network of health care units	expand to new places	SO_17
Have a qualified, experienced and motivated clinical staff	Create value for its shareholders and other stakeholders.	SO_18
		SO_19
		SO_20
		SO_21
		SO_22
		SO_23
		SO_24

For the model, it was choosing the first line of Table 8, this is the SO_2: Double Turnover. To simplify the understanding of the created instance, the architecture was divided into four viewpoints, although the entire model is presented in Figure 36 in APPENDIX C. To understand the connection between those four viewpoints, some elements were always present, namely the processes and sub-processes.

Figure 29 represents the first viewpoint, where is represented just the business layer elements, where the interconnections between all processes were left. This diagram helps understands how the actors relate to the processes needed to Improve the Performance. As already explained in the metamodel (section 4.3) the actors contribute to two major processes and three sub-processes. The two principal processes are the *Analyze the Strategy* and *Improve Performance*, the three sub-processes inside of the second process are *Run Change Agenda*, *Run Strategy Map*, and *Run Balanced Scorecard*. In this case, for the SO chosen, there are three contributors:

- *António Lima Cardoso* that is the *Executive Administrator*
- *Sérgio Viana* that is the *General Manager*
- *Cláudia Cardoso* that is *Responsible for the Management Center*

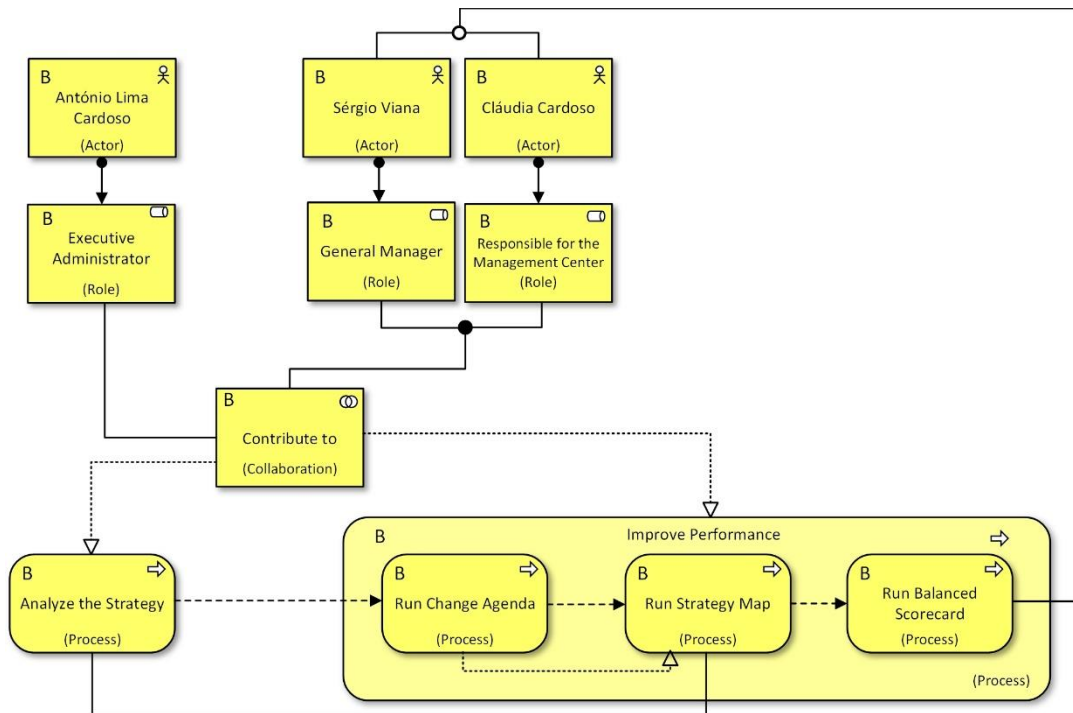


Figure 29 –Business Layer Viewpoint.

So, it can be concluded that the actors depended on the objective in analyze. In Figure 30 is represented the *Analyze the Strategy Viewpoint*, that corresponds to one part of the first stage of MC. Where is represented the most important concepts needed to find the SO, like the Resources: Human - *Skilled managers*; Financial - *The firm's ability to generate internal funds*; and Financial - *Ability to invest in state-of-art technology*; and like Capability: *Managerial Capabilities*. Those two concepts are connected with an assignment relationship.

The Capability has an association relationship with the corresponding part of the Competitive Advantage: *Leader in the health sector in Portugal*; and an influence relation with a part of the Purpose Statement: *Double the turnover by the end of 2024 in Portugal*. The other two sub-processes, inside of the *Improve Performance* process, are represented just for show the

association relation between the two motivational goals, the Purpose Statement (already cited) and the Strategic Objective: *SO_2: Double Turnover*.

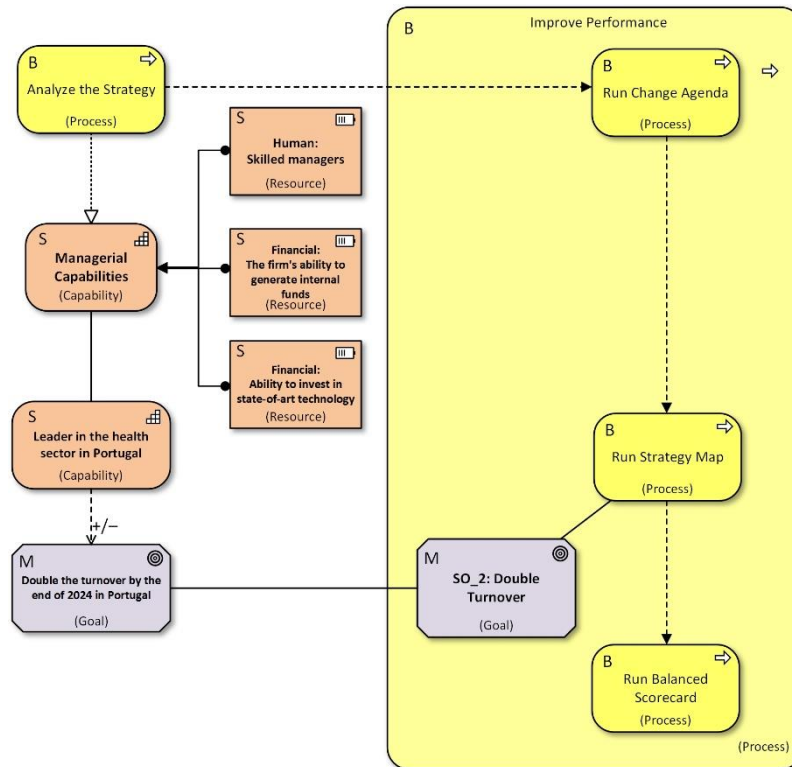


Figure 30 –Analyze the Strategy Viewpoint.

The process of *Run Change Agenda* is detailed in Figure 31, where it shows three lines of change agenda that realize (help to found) the SO. This process has an association relationship with the Driver *Need to Change* that has a junction (and) relation with three identified problems: *Low customer retention level*; *It only reaches a part of the population (education and financial problems)*; *Some special services not available*. With the corresponding scopes: *Business*; *Customer*; and *Service*.

Moreover, have an association relation between the problems and the corresponding Future Improvements: *Improve customer relationship management to retain more costumers*; *Create Health education campaigns and partnerships with health associations and insurance*; *Invest in new technologies to be the leader in special treatments*. The three Future Improvements have a realization connection with the Strategic Objective: *SO_2: Double Turnover*.

In Figure 32 is represented the *Run Strategy Map* process where is represented the Strategic Objective: *SO_2: Double Turnover* that belongs to the *Financial Perspective* and is associated with a direct cause-effect linkage: the *SO_2: Double Turnover is achieved through SO_15: Increase Revenue in Target Markets*. In addition the *Run Balanced Scorecard* process where starts with the Measure: *Turnover (calculated using the Billing Volume and the Total Assets)* that have an owner: *Cláudia Cardoso*, a Target: *350 million of euros at the end of 2024*. The SO have an influence relation with the Measure.

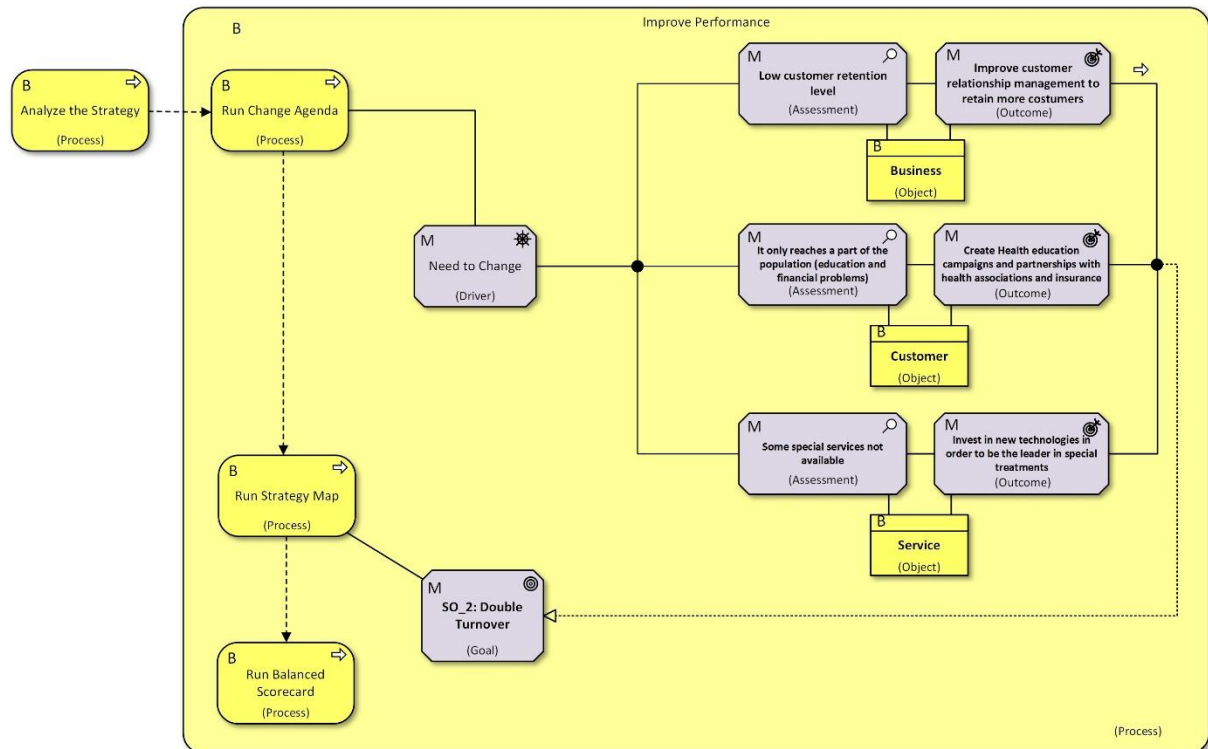


Figure 31 - Run Change Agenda Viewpoint.

The Measure Owner has an association relationship with the Value: *180.944.803€* where did it get an association for the Date of measurement: *2016*. The Owner of the Measure is one of the actors represented in the business layer, so have an association relationship with a junction (or) with the actors.

Between the Target and the Value connected with an association, leave an association for the Initiative: *Create partnerships with other industries*. What means that if the value does not achieve the Target, it is necessary to implement an initiative. Finally, the Target has a realization relation with the SO; this means when the target is reached perform the Strategic Objective.

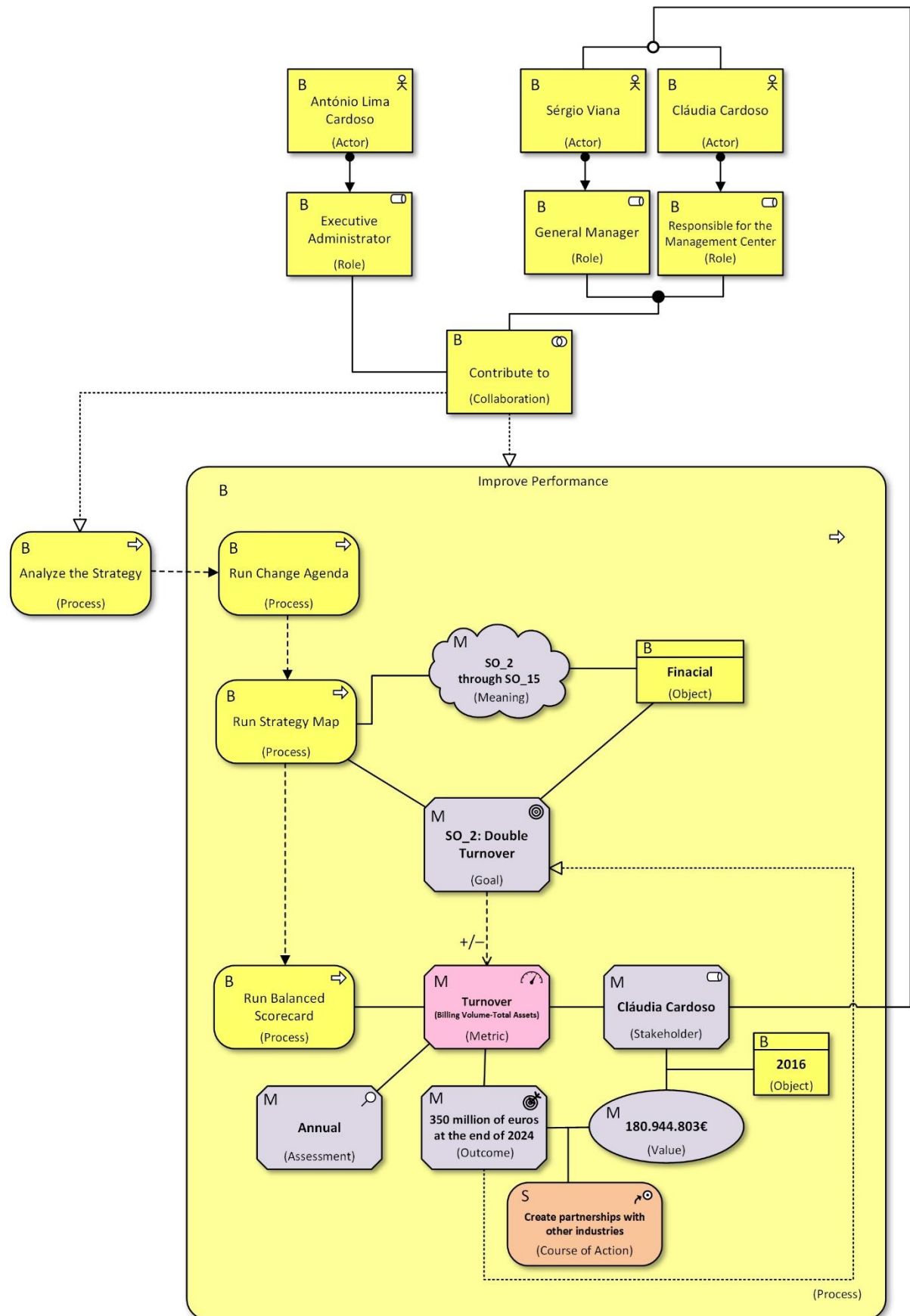


Figure 32 - Run Strategy Map and Run Balanced Scorecard Viewpoint

6 Evaluation

This chapter is divided into two sections, Thesis Proposal, and Demonstration. Where the analysis of what is done, the justifications, the comments, the evaluation, advantages and disadvantages of the proposed solution are presented.

6.1 Thesis Proposal

The diagram of the integration of BSC in MC have a representation of all the six stages, but an exhaustive detail of all has not been done since those were not the focus of the problem. With the vast amount of data, it was difficult to filter and organize the information to stick to the most relevant facts.

To create the two metamodels (UML and ArchiMate), the author focused only on the essential parts of the problem (see Figure 22 on page 27). The 2 metamodels focused mainly on BSC and corresponding tools necessary for its application to an organization. UML diagram was used to better understand the problem, in order to discover the most important elements to include in the final metamodel in ArchiMate.

Although the *Strategy Formulation* is a part of the first stage of the MC, it was not mentioned in the metamodels, because the BSC implementation is only possible if it already has an organizational strategy in place. So, it was considered that the formulation of the strategy was already undertaken by the organization. On the other hand, the BSA was included due to the need to understand the strategic contours of the organization and to assist in the discovery of strategic objectives.

There are many kinds of literature about Strategy, Balanced Scorecard, and other tools related to strategy, but about ArchiMate 3.0 there aren't many free things. The problem is that the courses are paid and very expensive. So, one of the parts more complicated was to comprehend this modeling language to model the metamodel in at least, a coherent way.

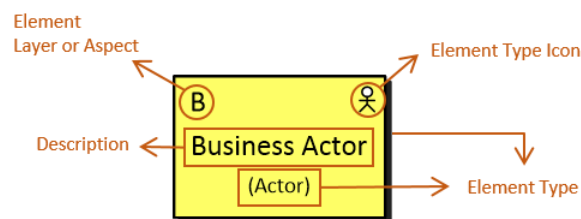


Figure 33 - ArchiMate notation adapted in Visio.

The metamodel was modeled first in Archi 4.0.1 (see APPENDIX B) using ArchiMate 3.0, and then it was modeled in Visio (see Figure 25 on page 34), using the same modeling language. It was opted for doing the final model in Visio, because it allows customizing the graphical elements using the notation presented in Figure 33 to make the model more understandable, even in gray tones. Moreover, it permits the representation of the Metric (Figure 34), a specialization of Driver that already exists as a concept in ArchiMate 3.0, but does not appear in the elements library of Archi 4.0.1. (Lankhorst, 2016)

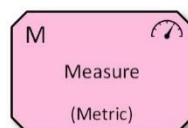


Figure 34 - Graphical representation of a Motivational Metric element.

For the *Measure* and the *Target*, two elements that already exist in the concepts of ArchiMate 3.0 were used, unlike other literary sources (Serrão, 2016) that have proposed the addition of new elements to represent these two concepts of the BSC. For the *Measure*, it was used the Motivation Metric element, a specialization of the Driver presented by Marc Lankhorst in a webinar with the title “*ArchiMate 3.0 in Practice*” (2016), where the graphical notation is represented in Figure 34. *Measure* can be seen as a KPI to understand what can be considered correct (an example of *Measure* can be *Productivity*).

Moreover, to represent *Target*, it was thought appropriate to use the Motivation Outcome element that represents the desired result of what we want to achieve (the goal). *Target* can be seen as a result that is needed to achieve to complete the goal, like this example: *Improve Productivity* is our goal; the *Measure* is *Productivity*, and the *Target* for that *Measure* is 80%. In this example, it was thought the need to achieve 80% of *productivity* as a result to reach the goal (*Improve Productivity*).

As in this example, it was considered in ArchiMate Motivational Outcome element as a result that is necessary to accomplish the Motivational Goal. In addition, the *Initiative* was represented as a Strategic Course-of-Action element, that represents a plan to be undertaken in order to accomplish the goal.

6.2 Demonstration

To the demonstration, a health care industry was chosen as one of the largest areas where ArchiMate has gained ground, 7% of the total use of this modeling language is in this industry (see Figure 17 on page 24). It is a pure, current and customer-oriented service, that is much to gain from applying the BSC: improve organizational performance and create value for the customer.

A private organization was chosen because the application of BSC to a public institution has very specific characteristics that have not been studied. LS was chosen because is one of the largest groups of health care providers in Portugal, it was the first health group quoted in stock market (in 2014) and have a diversified health care network with great coverage at national level. This demonstration was divided into five parts: the BSA, the CA, the SM, the BSC and the application of the metamodel to the organization.

The Business Strategy Analysis (BSA) of Luz Saúde was developed by the author and are only a proposal. There may be others with more credible information, this was executed without the participation of LS. While this process has not been detailed using ArchiMate, the author has the notion that this modeling language can help to better understand the links between the actors and processes. Moreover, should be easier to an outsider (non-strategic people) apply it to an organization, following the steps (boxes and arrows) of that process and comprehend the connection between the concepts.

Likewise, the Change Agenda (CA) was shaped by the author highlighting some situations founded in newspaper articles which were considered problems that needed solutions that were proposed. It is easier to realize the connection of this sub-process in the global model with CA represented in ArchiMate. Although, for the model, only one SO was necessary, but an analysis was made of the current situation of the institution to understand the application of the tools. Thus, 24 Strategic Objectives were achieved with corresponding Measures, Targets and Initiatives (see Tables 4, 5, 6, 7 and 8).

The Strategy Map (SM) was also created in this dissertation and is also a proposal strategy story that can have different outcomes if SO's are changed. Discovery the strategic objectives to Luz

Saúde organization was a difficult part. Although LS presents some of the SOs in the financial reports, those were very broad. So, it was, therefore, necessary to read and analyze documents concerning to LS and to spend a lot of time organizing and linking all the information with the PS, the BSA and the CA, in order to reach more concrete Strategic Objectives, which could be used to draw up a SM and apply the BSC, which adversely affected time management.

The representation of SM as a cause-effect linkage in ArchiMate creates a simpler way to represent a complicated model, it just needs to indicate what comes before and after of our focused strategic objective. This detail level creates focused models for each SO.

After finding the SOs, it was necessary to study in more detail KPI's, standard targets and how to reach those SO in order to define the Initiatives. Although the demonstration of the artifact developed just need one line of the table (like one SO, one M, one T, one I), the study was conducted in the way of understanding how to apply these frameworks to any organization. Moreover, nothing better than practice to understand the basic reasoning and at the same time to obtain a critical mass of data for possible future sharing with the studied institution.

Concluding that all the concepts of BSC can be represented in ArchiMate, this helps to simplify the view and the application of the BSC to an organization. With this modeling language, it is not necessarily a large diagram to show the application of the BSC. A complex management tool becomes a simpler diagram where is easy to fill and understand. After collecting all these data, the application of the metamodel to Luz Saúde has become an easy task, being the most difficult part to obtain the data needed to fill the model.

ArchiMate is good to represent the links between the processes, tools, and frameworks and to show how that concepts and elements are interconnected. Furthermore, to explain that architecture to an outsider (non-strategic people) is better use just one language that is presented graphically than through all different kind of diagrams, tools, and literature. In one diagram, in a single page, we can represent all type of concepts and elements using just one modeling language.

The best point of it, is that it can be created a diagram for each of the Strategic Objectives focused in that is special connections, like, the SO_2 have specific Measure and Target, specific change agenda lines, specific resources and capabilities, and specific actors and Initiatives associated with that specific SO. So, in implementation, to control is best to start with one objective, see what is needed to do and then when that is accomplished we go to another SO; creating a methodology to achieve better performance.

The main difficulties encountered were: Organize information about the institution, Identify the strategic objectives and Understanding ArchiMate Modeling Language.

7 Conclusion

Regarding results, the author considers that the proposed goals were achieved: a match between strategic concepts was presented using ArchiMate elements. ArchiMate was used to help BSC application, and all research questions were answered during this study, resulting in the application of BSC metamodel to a healthcare organization.

At the end of this study, the author has the perception that the ArchiMate is a helpful tool that can support companies implementing their Strategy Maps using Balance Scorecards to monitor and control the implementation.

The use of ArchiMate in the BSC application has some advantages:

- Simplify visualization of the interaction between actors, processes and process elements;
- Facilitate the understanding and application of the tools even for people who are not of the specialty;
- Facilitate the connection with the architecture of the rest of the company, namely people (eg attribution of responsibilities), like the *Measure Owner* presented in the metamodel..
- Permits the creation of different viewpoints for the various stakeholders that are liked diverse points of view, critical to show just the important parts to the different stakeholders.

and some disadvantages:

- Although it is a free modeling language, ArchiMate courses are paid for and expensive;
- It is not yet a very widespread language in the business world, at least in Portugal.

As future work, it is suggested the improvement of the work developed with the help of a Luz Saúde internal team to obtain more reliable information and target the main problems vs. objectives. Those tools can help drive performance, so it is advisable in this type of organization (of large dimensions) to have a specialized team only to develop, implement and control the strategy.

After the implementation of BSC to LS, data should be collected, i.e., proceed to a periodical measurement, and then the data gathered should be compared with the value of the target settled to understand if the SO was reached and in what time. Thus proposing the implementation of the BSC developed to the institution.

Another idea is to implement the other four stages of the Management Cycle to Luz Saúde, to achieve better results. Then try to create a simpler methodology to help implement all the Management Cycle into organizations. The rest of the MC can also be modeled in ArchiMate, and other viewpoints can be extracted from the model presented.

Since the objectives were one of the most difficult points, it might be interesting to create a database with predefined objectives that could be applied to different types of industries. These objectives could also be associated with KPI's (Measures), how to calculate and possible actions to be implemented to achieve those objectives. Almost like what happens with COBIT, where there are general goal lists and then within those specific objectives related to the IT department. This database could help outsiders (non-strategic people) to apply this tools to the organizations saving time and complications. The ClearPoint Strategy Blog (2016) already has lists of KPIs and Measures, although they are not integrated with each other.

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APPENDIX A: Luz Saúde Strategy Analysis

A.1. Internal Analysis

A.1.1. Tangible Resources

Financial	<ul style="list-style-type: none"> •The firm's ability to generate internal funds •Ability to invest in state-of-the-art technology
Physical	<ul style="list-style-type: none"> •Most of the medical and surgical specialties available •Latest and sophisticated medical technology in one place •Complementary means of diagnosis and differentiated services •Many free parking spaces •Good road access •Proximity to central trade and service areas
Techological	<ul style="list-style-type: none"> •Luz Saúde Trademark •The Bureau Veritas Quality Certificate was awarded to the quality management system implemented in the Imaging, Clinical Analysis, Transfusion Medicine and Central Sterilization
Organizational	<ul style="list-style-type: none"> •Partnersships with insurance companies •Luz Saúde Trading Center (SuppliersManagement)

A.1.2. Intangible Resources

Human	<ul style="list-style-type: none"> •Clinical staff with high level of experience, competence and specialization •High skilled employees •Continuous formation •Managerial capabilities
Innovation	<ul style="list-style-type: none"> •Innovation and Reaserch capabilities •Following scientific and technological advances
Reputation	<ul style="list-style-type: none"> •Brand Reputation •Perceptions of service quality and reliability •Efficient, effective relationships

A.1.3. Capabilities

Corporate Function

- "Luz Saúde" Brand
- Social Responsibility
- Information sharing through Luz Saúde Magazine
- Managerial capabilities

Management Information, Research And Development

- Innovation and Research capabilities
- Following scientific and technological advances
- New Service development

Operations

- Many surgical specialties
- Diagnosis through sophisticated medical technology
- Clinical Pathology and Differentiated Clinical Analysis
- Radiology
- Specialty Exams
- Urgent Help 24 Hours
- Maternity
- Operating Room
- Specialties medical consultations
- Robotic Surgery
- Diagnose and treat quickly and effectively
- Custom treatment
- Continuous training

Marketing

- Information Magazine Luz Saúde
- Building Reputation for Quality

Sales and Distribution

- Efficient and fast admission and discharge
- Short waiting queues

Service

- Customer Service

A.1.4. VRIN

VALUABLE

- Medical and surgical specialties
- Diagnosis through and sophisticated medical technology
- Clinical Pathology with Routine and Differentiated Clinical Analyzes
- Radiology
- Specialty Exams
- Urgent Help 24 Hours
- Maternity
- Operating Room
- Specialities
- Robotic Surgery
- Diagnose and treat quickly and effectively
- Customer Service
- Clinical staff with high level of experience, competence, and specialization
- Innovation and Research capabilities
- Following scientific and technological advances

RARITY

- Short waiting queues
- Efficient and fast admission and discharge
- Custom treatment
- Investment in modern hospital assets
- Integration into the health sector PPP program

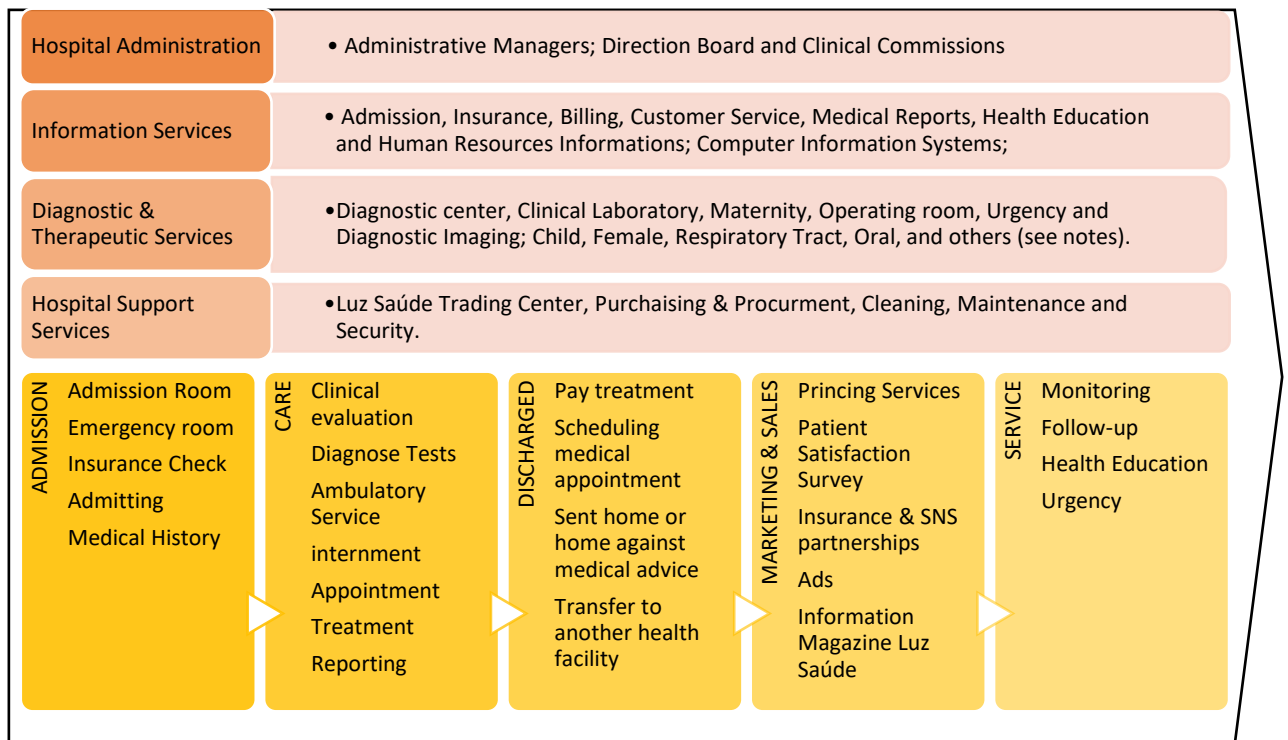
INIMITABILITY

- "Luz Saúde" Trademark
- Qualified, experienced and motivated clinical staff
- Long-term relationships with all the major paying agencies operating in the health sector in Portugal
- Model based on the best services and infrastructures in the sector

NON-SUBSTITUIBLE

- Diversified health care with quick access well geographically distributed
- Experienced management team with a history of growth management based on clinical excellence

A.1.5. Value Chain



Notes:

Hospital Administration – These are the managers of the hospital.

Administrative Managers is composed of:

- board of directors
- executive administrator
- general directors
- management centers.

Whose primary function is plan and coordinate administrative procedures and systems and find ways to improve processes; recruit, train, allocate responsibilities and evaluate directors performance and provide guidance to ensure maximum efficiency. (Workable, 2017)

Direction Board is composed by:

- Clinical
- Nursing
- Commercial and Operational Control
- Pharmacy and Supply
- Facilities
- Infrastructures and Equipment
- Marketing and Communication
- Urgent Care and Intensive Care Unit
- Information Systems and Technologies
- Operating Block
- Financial Directors

And have as their main function the management of the personnel and operations of each of the departments. Reporting to the Administrative Managers.

Clinical Commissions composed by the:

- Ethics Committee
- Commission for Control of Infection
- Pharmacy and Therapeutics Commission

Information Services – Documents and information processing

- Admission
- Insurance
- Billing
- Customer Service
- Medical Reports
- Health Education
- Human Resources
- Computer Information Systems

Diagnostic & Therapeutic Services:

- Diagnostic center
- Clinical Laboratory
- Maternity
- Operating room
- Urgency and Diagnostic Imaging
- Child, Female
- Respiratory Tract
- Oral
- Allergology
- Headache
- Diabetes and Metabolic Diseases
- Breast Diseases
- Prostate Disorders
- Musculoskeletal Diseases
- Pain, Endometriosis
- Aging
- Genetics
- Hernia and Abdominal Wall Pathology
- Aesthetic Medicine and Surgery
- Oncology
- Thyroid Pathology
- Memory Disorders / Dementias
- Cardiovascular Risk
- Sexual Health
- Vascular Health
- Obesity Treatment
- Dizziness
- Sleep

Hospital Support Services – provide support to the whole hospital

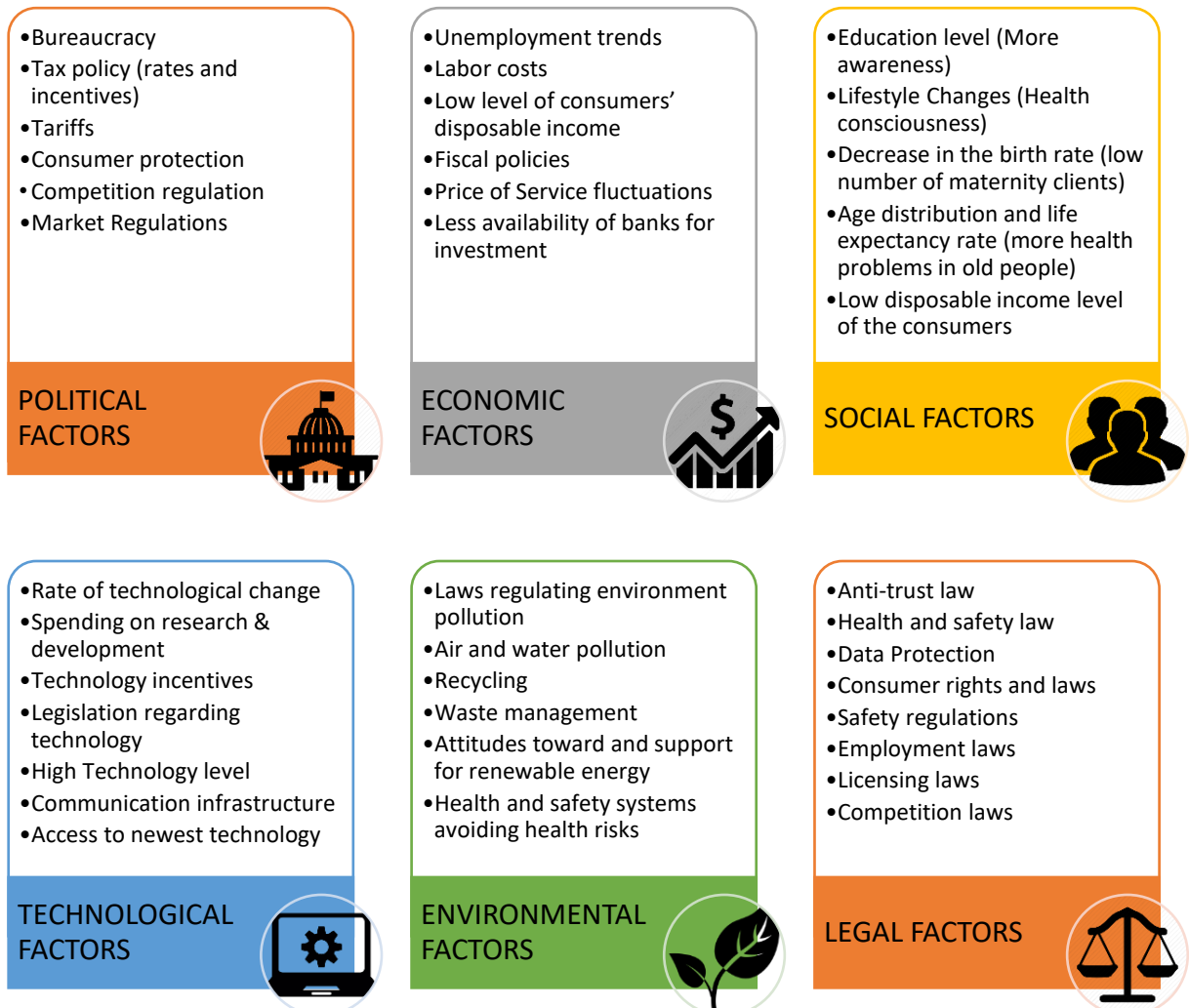
- Luz Saúde Trading Center – responsible for evaluation and selection of suppliers and products
- Purchasing & Procurement
- Cleaning
- Maintenance
- Security
- Emergency Medical Services, such as INEM, firemen and other hospital units

A.1.6. Core Competence

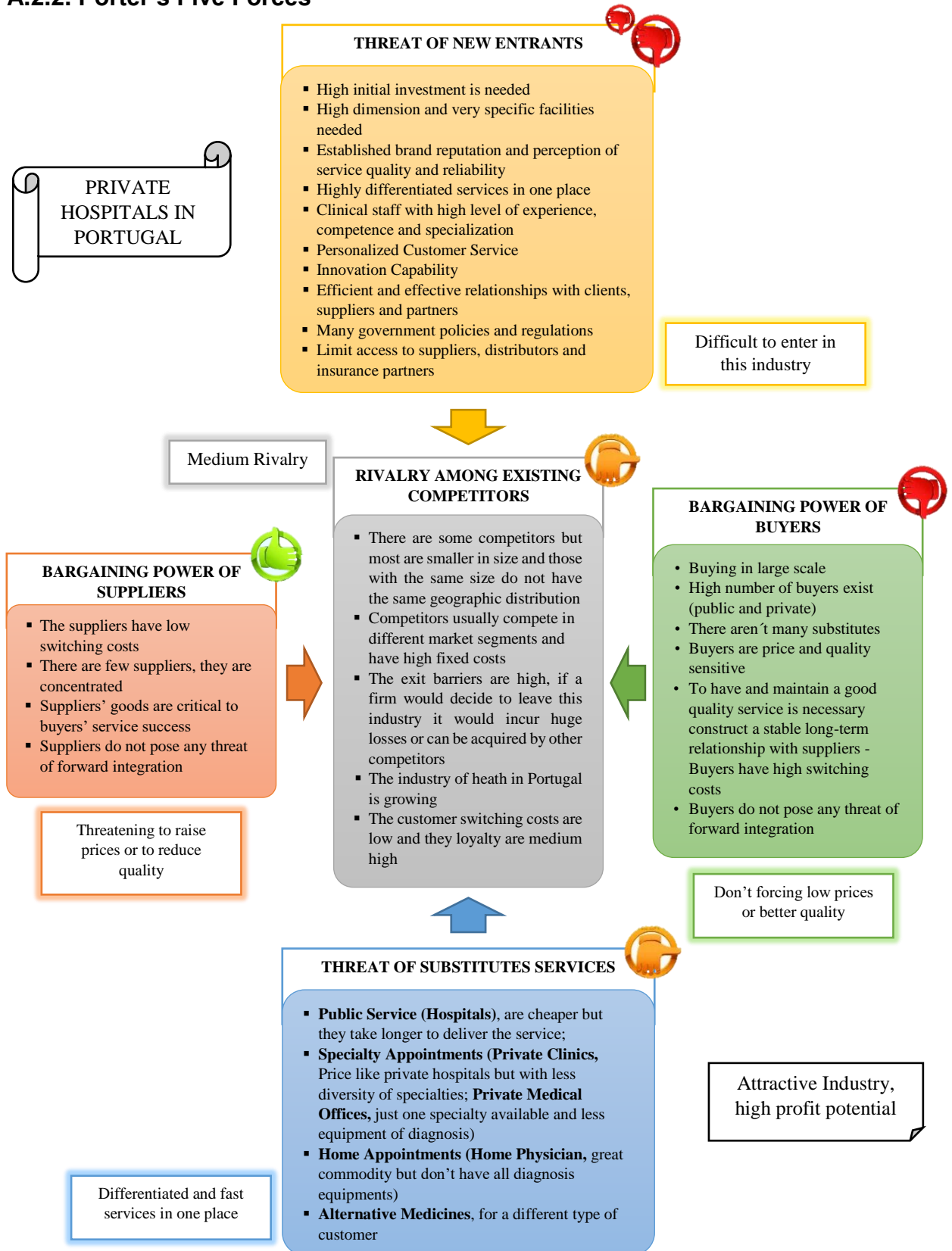
Experienced management team with a history of growth based on clinical excellence to a diversified health care with quick access and well geographically distributed.

A.2. External Analysis

A.2.1. PESTEL



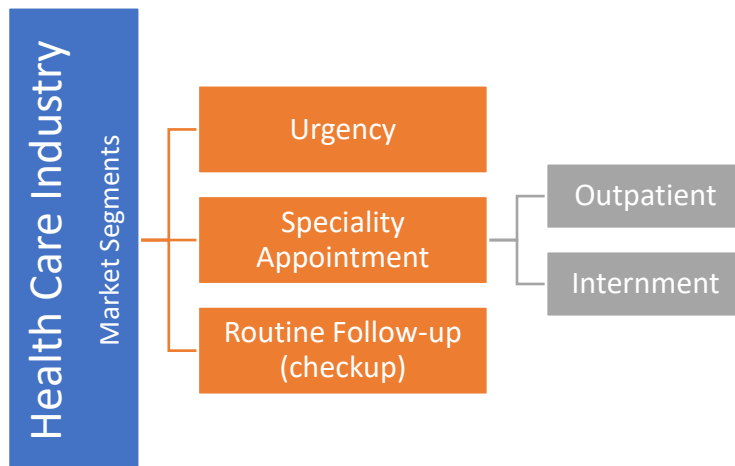
A.2.2. Porter's Five Forces



A.2.3. Critical Success Factors

- Negotiate new partnerships
- Ability to deliver high value to user
- High product quality
- Managerial ability and experience
- Innovative response to customer needs
- Integrate qualified, experienced and motivated clinical staff

A.3. Market Segments



A.4. SWOT



a) (Ferreira, 2017)

b) (Pimentel, 2017)

c) (Lusa, 2017) / (Guerreiro & Carvalho, 2017) / (Anon., 2017)

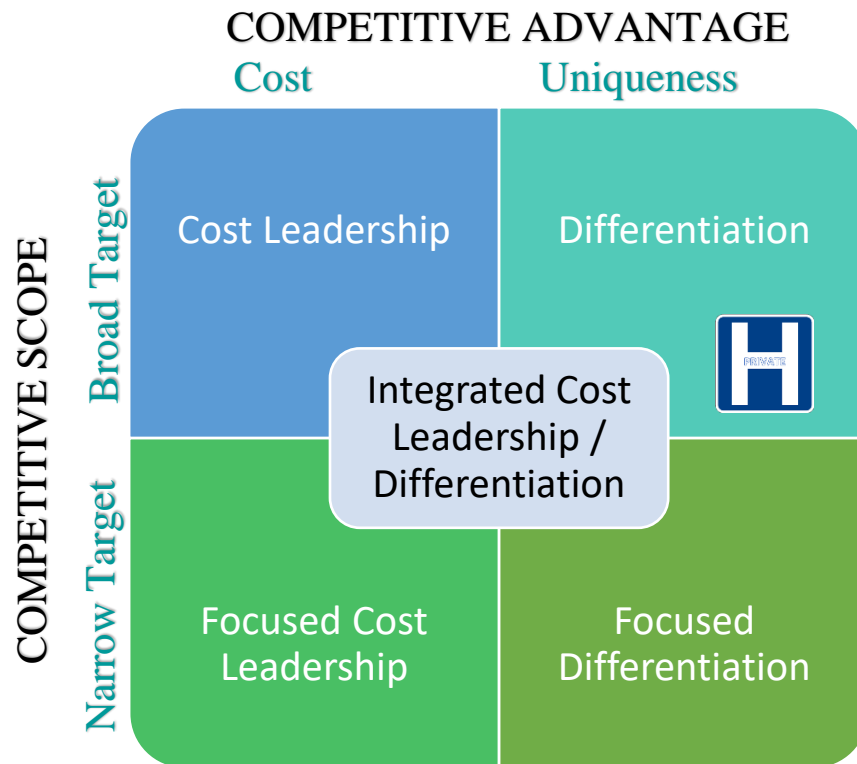
d) (Bastos, et al., 2017)

e) (Botelho, 2017) / (Arreigoso, 2017)

f) (Prado, 2017)

g) (Leiria, 2017)

h) (Arreigoso, 2017)

A.5. Porter's Generic Strategies

A.6. Purpose Statement

OBJECTIVE

LS will maintain the focus on profitable growth achieving the best health outcomes.

LS will double the size and production by 2019.

And will double their turnover by the end of 2024.

ADVANTAGE

They will:

- negotiate future partnerships with the State
- improve partner relationships
- invest million of euros
- improve the speed of access to diagnosis and treatment
- add new valances
- add new surgical plans
- expand to new places
- create value for its shareholders and other stakeholders.

SCOPE

- LS will focus in Portugal.



PURPOSE STATEMENT

LS will maintain the focus on profitable growth achieving the best health outcomes. They will double the size and production by 2019 and will double their turnover by the end of 2024. Through the negotiation of future partnerships with the State, the improve of partner relationships, the investment of millions of euros, the improvement of the speed of access to diagnosis and treatment. Through the adding of new valances and new surgical plans. Through the expansion to new places creating value for its shareholders and other stakeholders with focus in Portugal.

(Lusa, 2017) (Jornal i, 2014) (Luz Saúde, 2015) (Luz Saúde, S.A., 2017)

APPENDIX B: Metamodel in Archimate - Archi 4.0.1

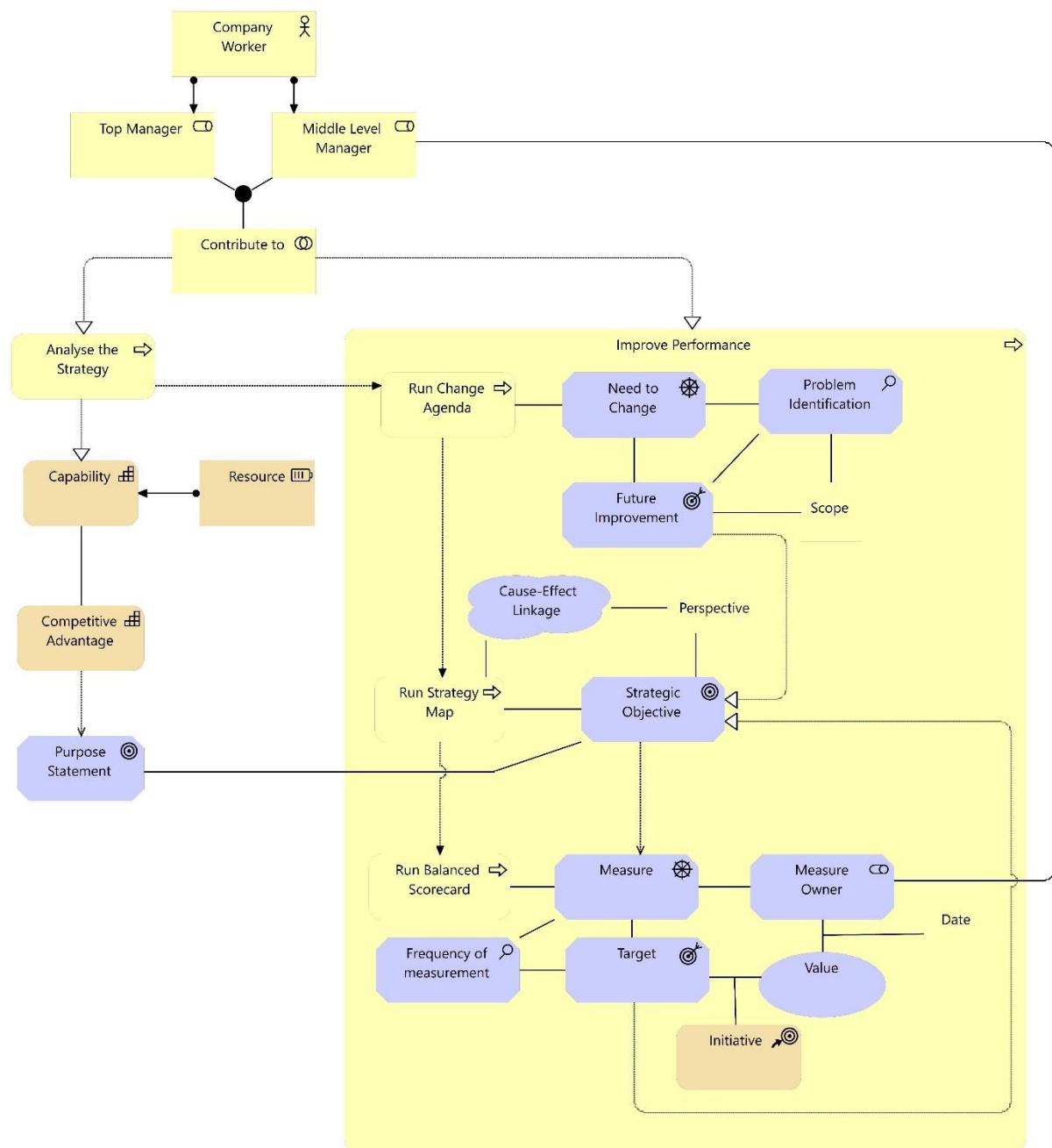


Figure 35 - Metamodel in ArchiMate 3.0 modelled in Archi 4.0.1.

APPENDIX C: Instance of Metamodel

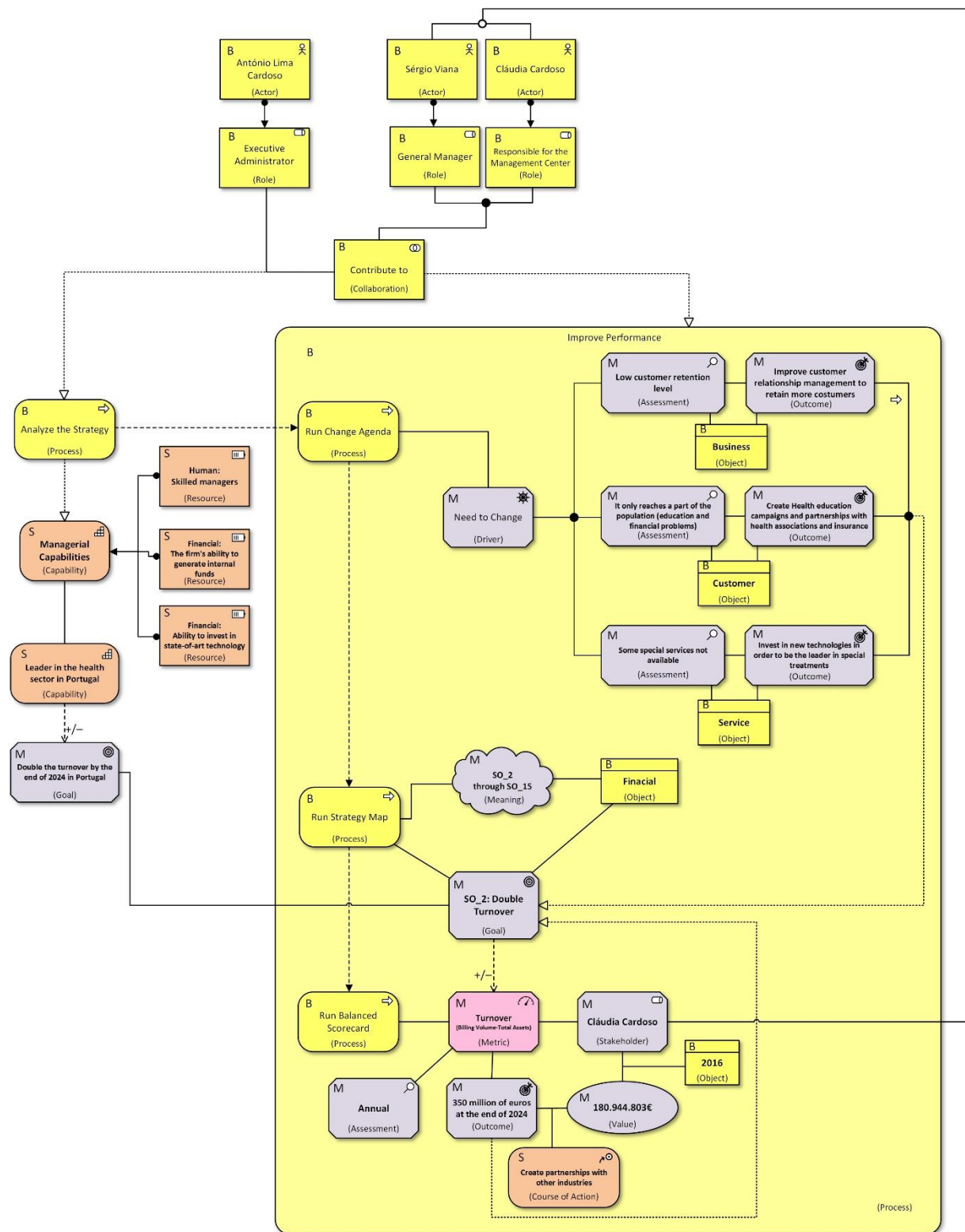
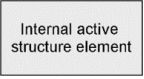
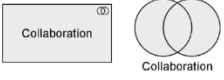

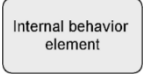
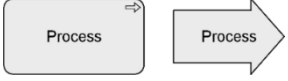




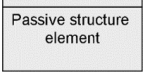


Figure 36 – Complete Model applied to LS.

APPENDIX D: ArchiMate Notation

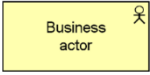

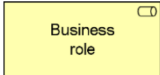

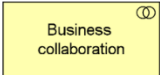



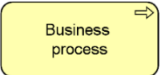






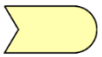

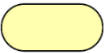
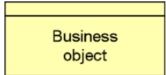
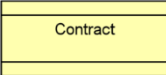

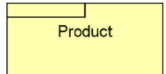
Table 9 - Core Elements.

Element	Specializations	Definition	Notation
Active Structure			
Internal active structure element		An entity that is capable of performing behavior.	
	Collaboration	An aggregate of two or more active structure elements, working together to perform some collective behavior.	
Interface		A point of access where one or more services are exposed available to the environment.	
Behavior			
Internal behavior element		A unit of activity performed by one or more active structure elements.	
	Process	A sequence of behaviors that achieves a specific outcome.	
	Function	A collection of behavior based on specific criteria, such as required resources, competences, or location.	
	Interaction	A unit of collective behavior performed by (a collaboration of) two or more structure elements.	
Service		An explicitly defined exposed behavior.	
Event		A state change.	
Passive Structure			
Passive structure element		An element on which behavior is performed.	

(The Open Group, 2012-2016)

In Table 10 are presented the elements of the business layer with the description and the graphical notation.

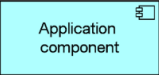
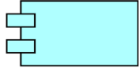
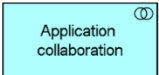

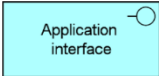











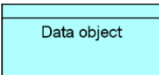
Table 10 - ArchiMate 3.0 Notation – Business Layer Elements.

Aspect	Element	Description	Notation
Active Structure	Business actor	A business entity that is capable of performing behavior.	 
	Business role	The responsibility for performing specific behavior, to which an actor can be assigned, or the part an actor plays in a particular action or event.	 
	Business collaboration	An aggregate of two or more business internal active structure elements that work together to perform collective behavior.	 
	Business interface	A point of access where a business service is made available to the environment.	 
Behavior	Business process	A sequence of business behaviors that achieves a specific outcome such as a defined set of products or business services.	 
	Business function	A collection of business behavior based on a chosen set of criteria (typically required business resources and/or competences), closely aligned to an organization, but not necessarily explicitly governed by the organization.	 
	Business interaction	A unit of collective business behavior performed by (a collaboration of) two or more business roles.	 
	Business event	A business behavior element that denotes an organizational state change. It may originate from and be resolved inside or outside the organization.	 
	Business service	An explicitly defined exposed business behavior.	 
Passive Structure	Business object	A concept used within a particular business domain.	
	Contract	A formal or informal specification of an agreement between a provider and a consumer that specifies the rights and obligations associated with a product and establishes functional and non-functional parameters for interaction.	
	Representation	A perceptible form of the information carried by a business object.	
	Product	A coherent collection of services and/or passive structure elements, accompanied by a contract/set of agreements, which is offered as a whole to (internal or external) customers.	

(The Open Group, 2012-2016)

In Table 11 are presented the elements of the application layer with the description and the graphical notation.

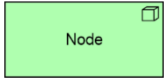
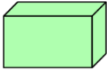
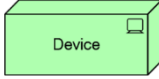

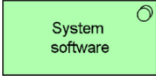
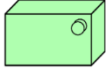
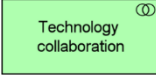



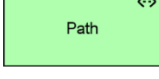
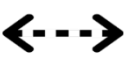


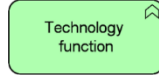

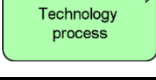

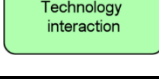



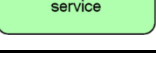



Table 11 - ArchiMate 3.0 Notation – Application Layer Elements.

Aspect	Element	Definition	Notation
Active Structure	Application component	An encapsulation of application functionality aligned to implementation structure, which is modular and replaceable. It encapsulates its behavior and data, exposes services, and makes them available through interfaces.	 
	Application collaboration	An aggregate of two or more application components that work together to perform collective application behavior.	 
	Application interface	A point of access where application services are made available to a user, another application component, or a node.	 
Behavior	Application function	Automated behavior that can be performed by an application component.	 
	Application interaction	A unit of collective application behavior performed by (a collaboration of) two or more application components.	 
	Application process	A sequence of application behaviors that achieves a specific outcome.	 
	Application event	An application behavior element that denotes a state change.	 
	Application service	An explicitly defined exposed application behavior.	 
Passive Structure	Data object	Data structured for automated processing.	

(The Open Group, 2012-2016)

In Table 12 are presented the elements of the technology layer with the description and the graphical notation.

Table 12 - ArchiMate 3.0 Notation – Technology Layer Elements.

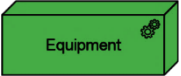
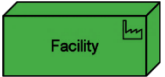


Aspect	Element	Definition	Notation
Active Structure	Node	A computational or physical resource that hosts, manipulates, or interacts with other computational or physical resources.	 
	Device	A physical IT resource upon which system software and artifacts may be stored or deployed for execution.	 
	System software	Software that provides or contributes to an environment for storing, executing, and using software or data deployed within it.	 
	Technology collaboration	An aggregate of two or more nodes that work together to perform collective technology behavior.	 
	Technology interface	A point of access where technology services offered by a node can be accessed.	 
	Path	A link between two or more nodes, through which these nodes can exchange data or material.	 
	Communication network	A set of structures and behaviors that connects computer systems or other electronic devices for transmission, routing, and reception of data or data-based communications such as voice and video.	 
Behavior	Technology function	A collection of technology behavior that can be performed by a node.	 
	Technology process	A sequence of technology behaviors that achieves a specific outcome.	 
	Technology interaction	A unit of collective technology behavior performed by (a collaboration of) two or more nodes.	 
	Technology event	A technology behavior element that denotes a state change.	 
	Technology service	An explicitly defined exposed technology behavior.	 
	Technology object	A passive element that is used or produced by technology behavior.	Abstract element
Passive Structure	Artifact	A piece of data that is used or produced in a software development process, or by deployment and operation of a system.	 

(The Open Group, 2012-2016)

In Table 13 are presented the elements of the physical layer with the description and the graphical notation. This layer is closely linked with technology layer because of the increase of

physical technology such Internet of Things (IOT) and computer-controlled machinery. It's like an extension of the technology layer with elements for modeling the physical world, such manufacturing, logistics and other physical environments. (Lankhorst, 2016)

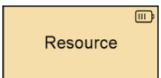
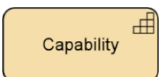
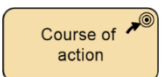
Table 13 - ArchiMate 3.0 Notation – Physical Layer Elements.

Aspect	Element	Definition	Notation
Active Structure	Equipment	One or more physical machines, tools, or instruments that can create, use, store, move, or transform materials.	
	Facility	a physical structure or environment.	
	Distribution network	A physical network used to transport materials or energy.	
Passive Structure	Material	Tangible physical matter or physical elements.	

(The Open Group, 2012-2016)

In Table 14 are presented the elements of the strategy layer with the description and the graphical notation.

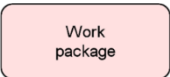

Table 14 - ArchiMate 3.0 Notation – Strategy Layer Elements.


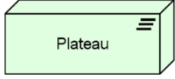
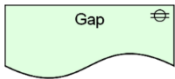
Aspect	Element	Description	Notation
Passive Structure	Resource	An asset owned or controlled by an individual or organization. “What do you need for that?” (that=capability)	
Behavior	Capability	An ability that an active structure element, such as an organization, person, or system, possesses. “What are you able to do?”	
	Course of action	An approach or plan for configuring some capabilities and resources of the enterprise, undertaken to achieve a goal. “How are you going to get there?”	

(The Open Group, 2012-2016)

In Table 15 are presented the elements of the implementation & migration layer with the description and the graphical notation. This layer represents the way how we can realize our architecture.

Table 15 - ArchiMate 3.0 Notation – Implementation & Migration Layer Elements.



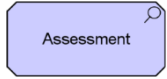

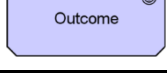
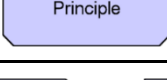
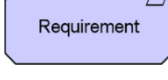
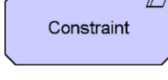
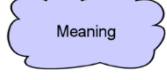
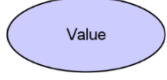
Aspect	Element	Definition	Notation
Behavior	Work package	A series of actions identified and designed to achieve specific results within specified time and resource constraints.	
Passive Structure	Deliverable	A precisely-defined outcome of a work package.	

Aspect	Element	Definition	Notation
Behavior	Implementation event	A behavior element that denotes a state change related to implementation or migration.	
	Plateau	A relatively stable state of the architecture that exists during a limited period of time.	
Passive Structure	Gap	A statement of difference between two plateaus.	

(The Open Group, 2012-2016)

In Table 16 are presented the elements of the motivation world with the description and the graphical notation. The motivation represents the reason behind an architecture, why is need it for. What are the goals, requirments, principles.



Table 16 - ArchiMate 3.0 Notation – Motivation Aspect Elements.

Element	Definition	Notation
Stakeholder	The role of an individual, team, or organization (or classes thereof) that represents their interests in the outcome of the architecture.	
Driver	An external or internal condition that motivates an organization to define its goals and implement the changes necessary to achieve them.	
Assessment	The result of an analysis of the state of affairs of the enterprise with respect to some driver.	
Goal	A high-level statement of intent, direction, or desired end state for an organization and its stakeholders.	
Outcome	An end result that has been achieved. “What is the result you achieve?”	
Principle	A qualitative statement of intent that should be met by the architecture.	
Requirement	A statement of need that must be met by the architecture.	
Constraint	A factor that prevents or obstructs the realization of goals.	
Meaning	The knowledge or expertise present in, or the interpretation given to, a core element in a particular context.	
Value	The relative worth, utility, or importance of a core element or an outcome.	

(The Open Group, 2012-2016)

In Table 17 are presented the composite elements with the description and the graphical notation.

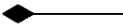
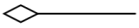

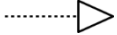

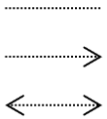
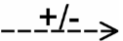
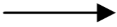
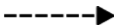
Table 17 - ArchiMate 3.0 Notation – Composite Elements.

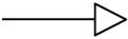



Element	Definition	Notation
Location	A location is a place or position where structure elements can be located or behavior can be performed.	
Grouping	The grouping element aggregates or composes concepts that belong together based on some common characteristic.	

(The Open Group, 2012-2016)

In Table 18 are presented the relationships with the description and the graphical notation.

Table 18 - ArchiMate 3.0 Notation – Relationships.

Structural Relationships		Notation
Composition	Indicates that an element consists of one or more other elements.	
Aggregation	Indicates that an element groups a number of other elements.	
Assignment	Expresses the allocation of responsibility, performance of behavior, or execution.	
Realization	Indicates that an entity plays a critical role in the creation, achievement, sustenance, or operation of a more abstract entity.	
Dependency Relationships		Notation
Serving	Models that an element provides its functionality to another element.	
Access	Models the ability of behavior and active structure elements to observe or act upon passive structure elements.	
Influence	Models that an element affects the implementation or achievement of some motivation element.	
Dynamic Relationships		Notation
Triggering	Describes a temporal or causal relationship between elements.	
Flow	Transfer from one element to another.	
Other Relationships		Notation

Structural Relationships		Notation
Specialization	Indicates that an element is a particular kind of another element.	
Association	Models an unspecified relationship, or one that is not represented by another ArchiMate relationship.	
Junction	Used to connect relationships of the same type.	  (And) Junction Or Junction

(The Open Group, 2012-2016)